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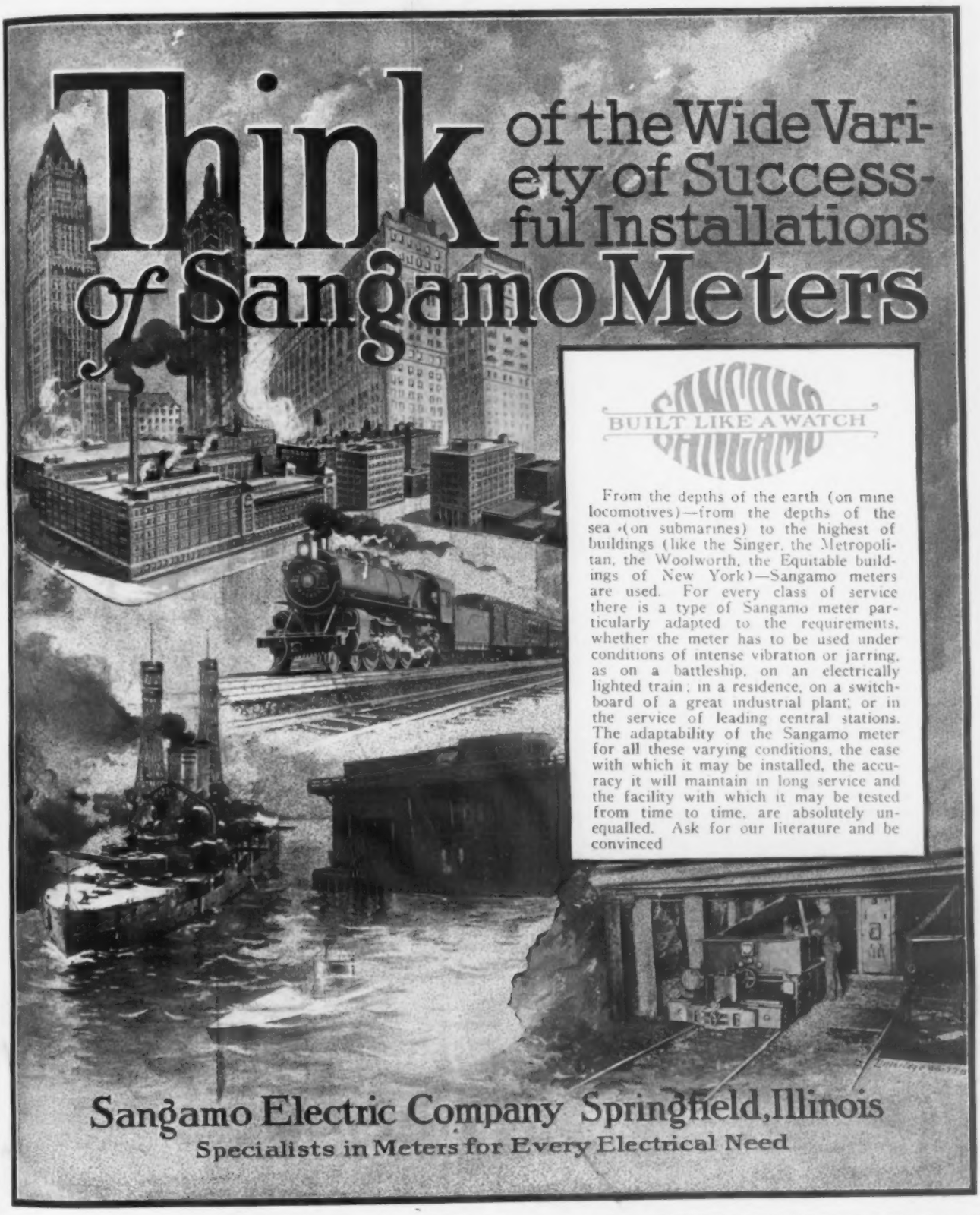
THE IRON AGE

New York, May 9, 1918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NATION WIDE STEEL-SERVICE

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FROM FOUR LARGE SERVICE PLANTS

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IRON STEEL MACHINERY

THE IRON AGE

New York, May 9, 1918

ESTABLISHED 1855 VOL. 101: No. 19

Saginaw Malleable Iron Co.'s Plant

Foundry of Modern Type for Large Production Laid Out for Extensive Additions—Making 50,000 Trench Mortar Castings Daily

WHEN the Saginaw Malleable Iron Co., Saginaw, Mich., made plans to erect a foundry, it had an advantage over foundries that add to original plants. It did not have to make the new fit the old, nor plan an extension with insufficient ground space. The company began with a site 55 acres in extent, and not being hampered by restrictions its only consideration was to build along most modern lines of malleable plants and for economical production with arrangements for providing additional units as needed though always keeping the final result the same as if it were all constructed at the one time.

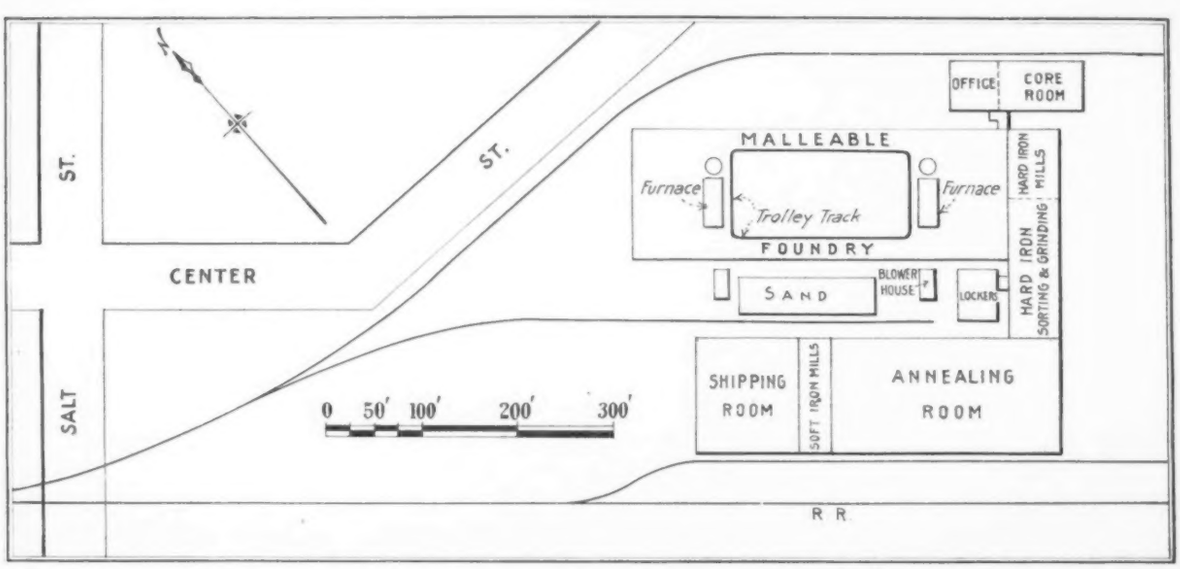
The plant at present consists of a foundry building equipped with two 20-ton air furnaces and other buildings for core, cleaning, sorting, annealing and shipping departments. The erection of another foundry building with two more furnaces is to be started at once, doubling the present melting capacity, and the plans provide for the erection of two additional duplicate units. With the four building units for melting purposes, the plant will have eight furnaces and a yearly capacity of 50,000 tons of castings.

The plant was erected by interests closely affiliated with the General Motors Corporation, and was designed to make automobile castings. It was placed in operation late last fall, but had not gotten well under way before practically its entire capacity was turned over to Government work in the making of castings for trench mortars. These are now being turned out at the rate of 50,000 castings per day.

The plant is located on the Michigan Central, Grand Trunk, and Pere Marquette railroads, and one factor that entered into the selection of a site was that it has a gradual slope at the rear, providing filling space for the disposal of refuse.

View in the Sorting Room to Which the Castings Are Taken in in Trucks of 800 to 900 Lb. Capacity, After Leaving the Hard Iron Cleaning Room. Labor is conserved by running the trucks upon a long platform shown, where the castings are sorted, the good pieces being thrown into the trucks on the floor, and the defective pieces into tote boxes. Castings are carried in these trucks from the time the molds are shaken out until they reach the shipping room

The convenient arrangement of the plant is shown in the accompanying drawing, which indicates the course of the castings from the time they leave the foundry until they are shipped. They pass from the foundry to the hard iron cleaning department at the end of the foundry building, and from there straight on through the hard iron sorting and grinding rooms, annealing room, soft iron cleaning room and shipping room. The plant is served by three parallel railroad sidings as shown. Pig iron is brought in on the track on the right, or northeast, where the pig-iron storage yard is located. Sand and coal come in on the center track to storage bins. Raw material is taken into the foundry on industrial tracks from the two sides of the foundry. The third track on the southwest provides an outlet for the finished product from the shipping room. The core room adjoins the office at the front. The foundry extension to be added this spring will be located in line with the present foundry building, and connected to the hard iron departments, which will be widened 25 ft. This will bring the hard iron cleaning, sorting and grinding departments directly between the melting buildings.



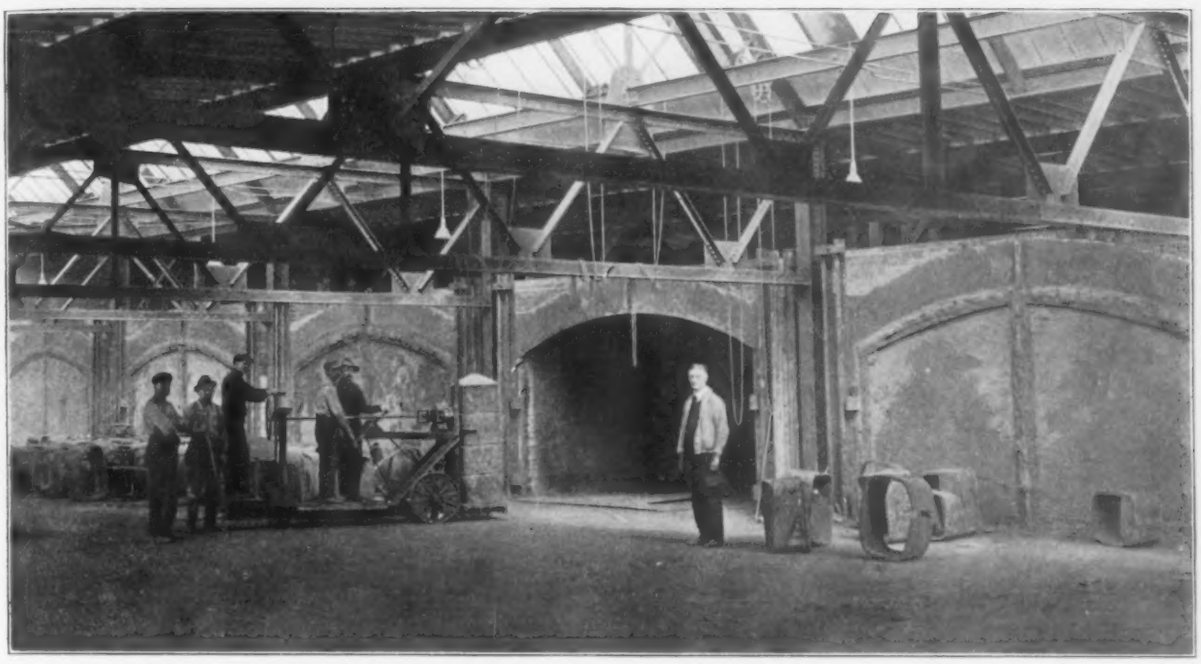
The Plan of the Plant of the Saginaw Malleable Iron Co. Allows for Unit Expansion Toward the Right

The foundry and annealing buildings are of structural steel and brick, and the other buildings are of mill construction. The foundry building has a Pond type of truss roof and steel sash in the side walls fitted with factory glass. The side bays are unusually low. These are only 19 ft. in height on the outside, the roofs being nearly flat. The roofs of the foundry and annealing rooms are gypsum tile in 10-ft. slabs, made by the U. S. Gypsum Co. It is stated that with this type of roof there is no condensation from it to drop on the molding floor. The foundry has two 8-ft. concrete aisles, the remainder being the usual clay floor. The floor of the annealing department is creosoted wood blocks laid on cement. All other floors are concrete.

The foundry building is 400 ft. long and 136 ft. wide. It is divided by the building columns into four 30-ft. bays, the outer bays being separated from the two inner ones by the aisles. The furnaces are located in the center of the foundry 200 ft. apart. A continuous trolley track runs around the sides of the furnaces alongside the tapping spouts and through the aisles from one furnace to the other. The bulk of the metal is conveyed on a hand-operated trolley on this monorail track in bull ladles having a capacity of 600 lb. each. As far as possible both furnaces are tapped at the same time. The bull ladles of metal pass down aisles in which they are poured into the hand ladles, and when the larger ladle is emptied it continues its circuit to the other furnace again to be filled. Thence it passes through the opposite aisle, and finally on being emptied is returned to the first furnace. Molders take metal directly from the furnace in hand ladles to the lower ends of the plant not served by the trolley track.

The melting furnaces are of the straight-top type, coal fired. Their overall length is 45 ft., and their width is 8 ft. Each furnace has four tap holes, two on each side. Instead of being hand-charged the furnaces are charged by an electric hoist and hand-operated trolley that spans the space directly above the furnace. The trolley traverses a runway attached to the roof trusses, its span and travel about corresponding to the dimensions of the furnace. The hoist is of the Sprague type with a capacity of 3 tons. Pig iron, sprues and scrap are charged into the furnace in charging boxes carried on trucks and holding 2½ to 3 tons of material. The pig-iron charges are brought on industrial tracks that extend from the storage yard to the side of the furnaces. The charging boxes are equipped with tripping devices for dumping the load after the hoist has raised it over the bath. It takes only 30 min. to load the furnace with a 20-ton charge. The usual charge is from 22 to 24 tons. Coal is brought in hopper cars of 1½ tons capacity and dumped in bins in front of the furnaces. The furnaces are fired by three men, a stoker and two shovelers. A crew fires only one heat per day, being relieved by a new shift, and doing less laborious work during the remainder of the day.

The electric hoist is also used for lifting the bungs which are three-brick wide except the wind bungs. The provision of the hoist permits the use of heavy bungs. The bungs have 1½-in. set screws at each end, which clamp the bung brick in place. The tops of the bungs are made of 4 x 5-in. T-iron, each bung having three of these irons. Each furnace has a radial brick stack lined

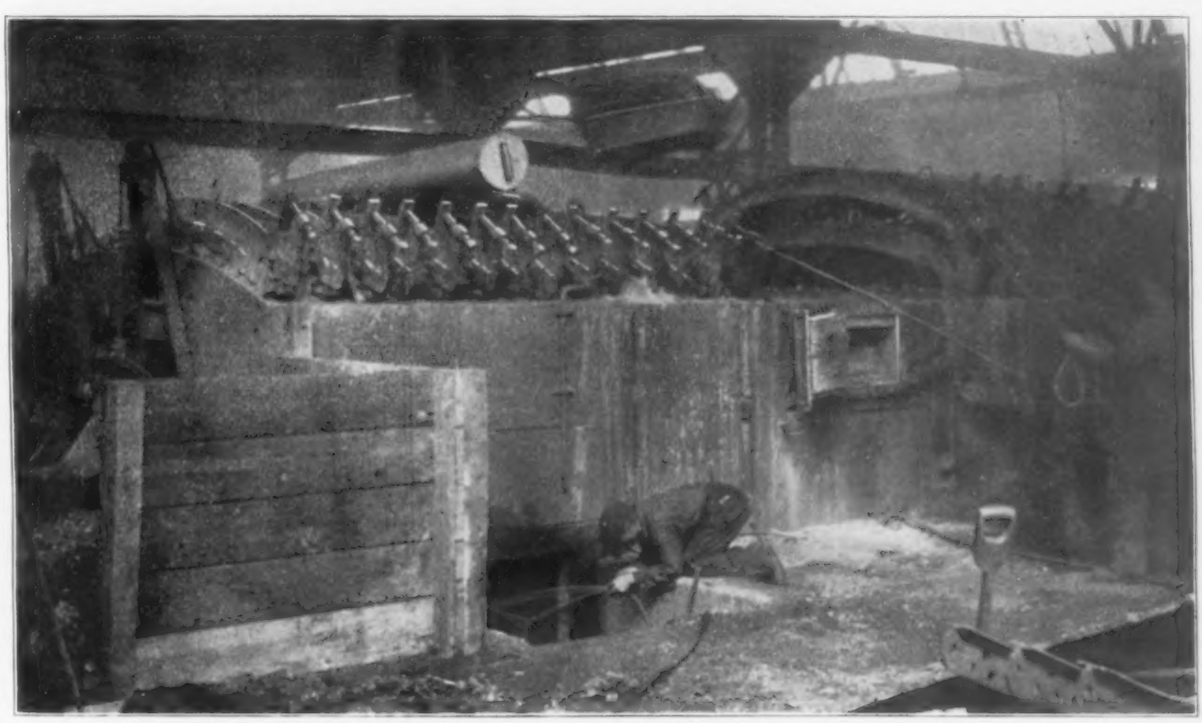


View in the Annealing Department Which Will Be Provided With a Continuous Battery of 11 Ovens. The annealing pots are charged into the ovens with a hand-operated charging machine. Abundant floor space is provided in front of the ovens, and the truss type of roof makes the room well lighted. C. F. Drozeski, president and general manager of the company, appears in the foreground in this picture

with fire brick. Blast for each furnace is supplied by a Sirocco fan with a 7 x 20-in. down discharge, and driven by a 20-hp. motor. The fans are located in a separate blower house just outside the foundry. The blast is carried to each furnace underground in a galvanized duct 27 in. in diameter that is laid in a concrete conduit 3 ft. square.

The furnace charge includes about 33 per cent sprues, that being the percentage of foundry remelt resulting from the large feeders required to take care of shrinkage. About 5 per cent of the charge is sections of steel rails, used because of low carbon content.

Each molder has a large floor occupying one-half of a bay, or 30 x 9 ft., and if he is doing heavy work he sometimes has a double floor space. All molds are made on Farwell hand squeezers, of which there are 80 in the foundry. Each molder has two piles of sand. When his castings are shaken out he works during the afternoon over the cold pile while his first pile is being cut over and tempered and has a chance to cool. A sand cutter, built by the Sand Mixing



Instead of Being Hand Charged the Furnaces Are Charged with an Electric Hoist That Dumps About 3 Tons of Material Into the Furnace From a Charging Box, Making It Possible to Load a 20-Ton Furnace in 30 Minutes. This photograph shows the charging box about ready to have its contents tripped into the bath

Machine Co., is to be installed to prepare the sand for the molders.

An interesting feature of the molding machines is that the vibrators instead of being attached to the pattern plate are attached to a yoke on the back of the machine and accomplish the vibration by contact only. This contact is with a projection about 1 in. wide on the pattern plate, extending out from the flask. The advantage of this method of vibration is that the cords that supply the electrical current to the vibrators are not worn out by the constant turning over of the flask. The L & A vibrators are used, made by the Pressed Steel Co., Muskegon, Mich.

The mortar castings include the head and base for 3-in. Stokes trench mortar shells. These are in the general form of disks, 3 in. in diameter and weigh 2 lb. each. No core work is required in molding these castings. They are molded, 8 in. on 11 x 17-in. snap flasks. A metal band is placed on the cope and drag, to avoid using jackets. The pattern is held in the pins of the guide by standard lugs with slotted holes for adjustment.

In the manufacture of the castings a test bar is taken of each heat, and every heat is kept separate as the castings pass through the plant for the various operations. The castings made from each heat, when they reach the shipping room, are placed in a separate pile where they are kept until a report is received of Government tests. Tests of the iron from which the castings are made have shown a tensile strength of 53,205 lb. per sq. in., and 19.5 per cent elongation in 2 in., and 53,505 lb. per sq. in., and 15 per cent elongation. The Government requirements for this metal is a tensile strength of 38,000 lb. per sq. in., and a 5 per cent elongation.

After the castings are shaken out on the foundry floor they are loaded on three-wheel trucks, on which they are handled from the time they leave the foundry until they are delivered into the shipping room. There are 88 of these trucks and they eliminate a great deal of manual labor in handling and shoveling. The trucks have hopper-shaped tops, and are provided with removable jack tongues, of which the front wheel is a part. When the truck is standing still the tongue can be removed almost instantly, allowing the front of the truck to drop slightly so that it rests firmly on a foot projecting from this part of the truck. The trucks have a capacity of 800 to 900 lb. They were supplied by the Howe Chain Co.

The hard iron cleaning room, to which the castings go from the foundry, occupies a space 50 x 70 ft., and in this the castings are cleaned in five 30 x 45-in. Sly tumbling barrels. The tumbling mills stand above the floor on concrete foundations, providing sufficient space to run the trucks underneath. The cleaned castings are thus dumped into two trucks instead of being shoveled from the mills. The barrels are arranged in a row, and are driven by one overhead 25-hp. motor. This room is also provided with a Sly mill for grinding up old fire brick, for packing for annealing furnaces, and for mixing with silica sand for bottoms for the melting furnaces. A Sly cinder mill will also be installed adjoining the cleaning department.

After the first tumbling the castings are taken in the trucks in which they are dumped from the barrels to the hard iron sorting room, which occupies a space 50 x 145 ft. between the hard iron cleaning room and the annealing department. In the center of this room is a wooden platform, 90 ft. long, 10 ft. wide and 26 in. high. The loaded trucks are run up an incline to this platform. Alongside workmen sort the castings as they take them from the trucks. Good castings are thrown into other trucks on the floor, and defective castings into boxes to be dumped into small bins along one side of the room. A bin is provided for each man's defective work so that he can look this over and check up his work with the contents of his pay envelope. The method of sorting castings has reduced handling to a minimum. The sorting and grinding room is equipped with four double-wheel Norton grinders with 20-in. wheels.

The annealing department occupies a building 95 x 240 ft. with a Pond truss roof, and is provided with a battery of six ovens, coal fired from fire boxes in the rear. Space is provided for five additional ovens, which are being built, and all the ovens when these are completed will stand in one continuous battery. The ovens are 18 ft. wide and 24 ft. deep, and are all connected to one flue leading to a 100-ft. stack. The ovens are built of three layers of brick, the first fire brick, then Sil-O-Cel insulating brick, and on the outside common clay brick. The flues are in the outer walls close to the floor. The capacity of the ovens is 40 to 50 tons each. The temperature is controlled by pyrometers, a thermo-couple being connected to each furnace at the front and back. The temperatures are recorded on Brown recording pyrometers, seven of which are located in the laboratory adjoining the office. The ovens are charged with a Chisholm-Moore hand-operated charging machine.

The annealing castings pass to the soft iron cleaning room, where they are tumbled in five mills. The tumbling equipment of this room and its arrangement is a duplicate of that in the hard iron cleaning room. The tumbling barrels in both cleaning rooms are connected to dust-arresting systems located above the roof. The dust is discharged into the yard through a pipe. From the soft iron cleaning room the castings pass to the shipping room, occupying a space 95 x 100 ft., and from here they are loaded directly on cars through two loading doors.

Aluminum match-plates are used for making the trench mortar castings, and for most of the other work. There are eight patterns gated to a plate, and one sprue to a mold, and one runner to each casting.

The core room occupies a space 50 x 90 ft., and is provided with a battery of four ovens built by the company. These have chain-operated rolling lift doors. They are coke fired from a pit at one side. Cores are placed on racks built of angle iron and pipe, so constructed that the shelves can be moved to accommodate cores of different sizes. These racks are 4 ft. wide, 5 ft. long and 5 ft. 9 in. high. They are taken in and out of the ovens on an elevating platform truck. A core room for girls is provided in a partitioned-off section of the core room. A pit provides storage space for several months' supply of sand.

Sand from the storage bins is distributed to the foundry floor on trucks. A Simpson sand mixer is being installed, and all molding sand will pass through this before going to the foundry in order to make it uniform.

The foundry is heated by hot air distributed through ducts under the ceiling from a fan heating system located above the foundry floor between the roof trusses. Steam for the radiation is carried in an overhead line, being supplied by an outside boiler house. Other buildings are steam heated. The electric lamps are placed above the foundry floor to avoid making shadows. Ordi-

The Core Ovens and Racks on Which Cores Are Placed, These Being Taken to and From the Oven by an Elevating Platform Truck

narily not much artificial light is needed, as the outside light coming in through the glass in the sides of the truss roof makes the center of the foundry lighter than the sides. Arc lights are provided in the outside storage yards to permit night work.

A well-equipped locker room and lavatory are provided in a separate building centrally located, and connected to the hard iron cleaning room. This is provided, in addition to the usual equipment, with two showers, hot and cold water and steel lockers. Toilet facilities are also provided at three points on the foundry floor.

At the head of the company as president and general manager is C. F. Drozeski, formerly associated with the Illinois Malleable Iron Co., Chicago. The vice-president is W. J. Wickes, president Wickes Boiler Co., Saginaw, and vice-president Saginaw Shipbuilding Co. George H. Hannum, general manager of the General Motors Corporation interests in Saginaw, is treasurer; J. B. Kirby is secretary; Donald A. Drozeski, assistant general manager, and L. W. Lukens, superintendent. The plant was designed by and built under the direction of Frank B. Chase, industrial plant engineer, People's Gas Building, Chicago.

Molybdenum from Canada

Molybdenum ore treated in 1917 at the concentrators of the International Molybdenum Co. at Renfrew, Renfrew Molybdenum Mines at Mount St. Patrick, and the Mines Department at Ottawa, Canada, amounted to 692 tons, according to the Canadian *Mining Journal*. From this ore 80,614 lb. of concentrates were produced worth $108,501. The molybdenum contents of the concentrates varied from 52.9 to 93.5 per cent of MoS_2.

From the plants of the International Molybdenum Co. at Orillia and Tivani Electric Steel Co. at Belleville there was a production in 1917 of 149,000 lb. of ferromolybdenum valued at $348,775.

A meeting of the New York members of the National Safety Council will be held at the quarters of the American Museum of Safety, 14 West Twenty-fourth Street, New York, on Thursday evening, May 16. Shop safety meetings and dust and fume control are the topics.

Cleveland Supply Conventions Next Week

Addresses by manufacturers on the business situation in their several lines will be a feature of a joint session to be held Thursday morning, May 16, at the Hotel Hollenden, Cleveland, by the National Supply and Machinery Dealers' Association and the Southern Supply and Machinery Dealers' Association. Some of the addresses announced are as follows:

Transmission, Melville W. Mix, president Dodge Mfg. Co., Mishawaka, Ind.

Valves, Farnham Yardley, vice-president Jenkins Brothers, New York.

Twist drills, Richard T. Lane, sales manager Standard Tool Co., Cleveland.

Leather belting, William Brooks Covell, president International Leather & Belting Co., New York.

Steel products, William E. Manning, vice-president Youngstown Sheet & Tube Co., Youngstown, Ohio.

Bolts, N. J. Clarke, secretary Upson Nut Co., Cleveland.

Engineering specialties, David C. Jones, secretary-treasurer Lunkenheimer Co., Cincinnati.

Relation of export and domestic trade, Charles W. Beaver, Yale & Towne Mfg. Co., New York.

The American Supply and Machinery Manufacturers' Association will hold a meeting the same time, and on May 13 and 14 the National Pipe and Supplies Association has a convention at the Hotel Hollenden.

At the Wednesday afternoon meeting of the National Supply and Machinery Dealers' Association, a discussion is scheduled on the financing of the supply business under present conditions, considering: the investment of surplus monies, new capital, loans and trade acceptances. A paper on "Proper Location of Warehouses" is to be read by W. E. Frick, Frick & Lindsay, Pittsburgh.

At the Friday morning session of this association, the program includes a discussion on readjustment of plans for compensating salesmen owing to necessities of war conditions; the action being taken relative to filling up gaps made by men who have gone to war, and the advisability of requesting the establishment of Government warehouse prices on additional items not now so covered. A paper is announced by F. H. Kramer, Somers, Fitler & Todd Co., Pittsburgh, entitled "The Necessity of Backbone in the Sales Executive."

New Electric Steel Company

The Electric Steel & Forge Co., Cleveland, has been incorporated under the laws of Delaware with an authorized capital of $2,000,000 in preferred stock and 20,000 shares no-par in common stock to manufacture steel by the electric process, and to roll a forge tool and special alloy steel. The company plans to take over the plant of the Crucible Steel Forge Co., Cleveland, and to make some additions. The officers of the Electric Steel & Forge Co. are: James H. Foster, president Hydraulic Pressed Steel Co., president; D. W. Wells, general manager Crucible Steel Forge Co., vice-president and general manager; C. R. Cross, secretary, and A. B. Smythe, treasurer. Among the directors in addition to the officers are: W. D. Sayle, president Cleveland Punch & Shear Works Co.; H. C. Osborn, president American Multigraph Co. and Cleveland Brass & Copper Mills, Inc.; W. H. Staring, vice-president and general manager Peerless Motor Car Co., and James H. Herron, metallurgical engineer.

Standards for safeguarding power transmission apparatus in Federal industrial establishments is the leading article of the April bulletin of the American Museum of Safety, 14 West Twenty-fourth Street, New York City. A large number of drawings is included covering safety devices around revolving parts.

Iron and Steel Exports in March Decline

Unusual Conditions Affect Movement to Foreign Countries, but Exports of Machinery Increase —Work of War Industries Board Reflected

WASHINGTON, May 7.—Peculiar conditions affecting the distribution of iron and steel operated to prevent the participation of the industry in the notable gain in exports during the month of March as compared with February, as recorded by the Bureau of Foreign and Domestic Commerce. Although steel makers, as a class increased their output substantially during March, priority orders diverted so large a proportion of their product to domestic establishments having heavy Government contracts and such a large proportion of our shipments of war material to France were made by Government transports, and hence are excluded from the official statistics, that the reported foreign shipments of tonnage commodities registered a substantial decline compared with the February totals, although there was a material increase in the recorded exports of machinery and the total value of shipments of iron and steel of all kinds made a fractional gain. The reduced figures showing the recorded exports of tonnage of iron and steel reflect especially the work of the War Industries Board in speeding up deliveries to the shipyards and to the plants engaged on the expanded program of the Ordnance Department and in restricting manufacturers to Government work.

The total exports of iron and steel by values in March declined no less than 30 per cent as compared with the same month of 1917 and 33 per cent from the high record of December, 1917. The gain over February of this year was but 1.7 per cent. Tonnage commodities fell 37 per cent short of the exports in March, 1917, 42 per cent below the high water mark of December, 1917, and lacked 13 per cent of equalling the record of February of this year. Machinery, which in February showed a decline, made a subs antial gain of 27 per cent over the total for that month, but lost 4.8 per cent compared with March, 1917, and 23 per cent compared with the record figures for December, 1917. Exports of machine tools, which have shown a downward

Export of Iron and Steel

	March		Nine Months	
	1917 Gross Tons	1918 Gross Tons	1917 Gross Tons	1918 Gross Tons
Pig iron	69,629	.....	645,629	.....
Ferromanganese	.....	a101	.....	a3,634
Ferrosilicon	.....	a40	.....	a8,261
All other pig iron	.....	a9,708	.....	a307,181
Scrap	38,506	307	203,561	21,806
Bar iron	5,337	2,589	47,377	38,605
Wire rods	12,914	11,063	102,630	149,082
Steel bars	52,368	48,135	561,971	469,700
Billets, ingots and blooms, n.e.s.	193,469	144,443	1,414,996	1,502,962
Bolts and nuts	2,757	2,275	22,425	23,749
Hoops and bands	3,691	5,878	32,337	46,706
Horseshoes	166	377	3,244	8,104
Cut nails	240	347	3,560	3,529
Wire nails	6,824	6,161	97,725	91,557
All other nails, including tacks	1,482	854	13,412	10,704
Cast-iron pipes and fittings	8,129	5,134	59,161	61,893
Wrought pipes and fittings	9,992	5,174	131,788	81,028
Radiators and cast-iron house-heating boilers	627	131	2,767	2,339
Railroad spikes	1,821	754	14,687	12,054
Steel rails	52,469	24,600	474,812	314,317
Galvanized iron sheets and plates	7,926	5,884	68,431	60,147
All other iron sheets and plates	3,650	4,565	33,440	43,774
Steel plates	41,439	25,049	258,738	345,214
Steel sheets	9,696	16,006	81,502	129,780
Ship and tank plates, punched and shaped	.....	a2,266	.....	a24,720
Structural iron and steel	29,509	20,283	258,630	191,755
Tin and terne plates	21,679	16,336	164,270	159,684
Barb wire	16,079	12,244	263,528	129,864
All other wire	16,161	11,491	184,122	134,117
Total	606,560	382,195	5,144,743	4,376,766

a Not separately enumerated prior to July 1, 1917.

Exports of Machinery

	March		Nine Months	
	1917	1918	1917	1918
Adding machines	$206,274	$79,561	$1,194,329	$1,541,439
Air-compressing machinery	67,360	150,147	817,894	1,025,424
Brewers' machinery	6,209	11,348	14,239	226,266
Cash registers	68,159	42,647	1,100,783	386,340
Parts of	3,777	6,162	96,176	50,334
Concrete mixers	.....	a15,685	.....	a206,697
Cotton gins	10,449	28,558	89,536	110,634
Cream separators	74,521	57,234	284,117	393,044
Elevators and elevator machinery	191,592	153,907	1,538,164	1,528,028
Electric locomotives	26,673	17,000	474,002	122,679
Gas engines, stationary	63,350	15,456	461,486	459,775
Gasoline engines	2,094,379	4,420,831	11,585,460	22,807,906
Kerosene engines	.....	a827,320	.....	a3,698,291
Steam engines	2,077,010	1,906,431	13,302,011	30,679,236
All other engines	689,002	644,640	3,555,391	2,221,582
Parts of	1,347,857	.....	12,762,083	.....
Boilers	.....	a157,866	.....	a2,943,224
Boiler tubes	.....	a367,404	.....	a4,895,656
All other parts of engines	.....	a1,780,010	.....	a12,704,630
Excavating machinery	.....	a91,983	.....	a708,490
Milling machinery, flour and grist	79,945	133,313	905,034	750,666
Laundry machinery, power	14,476	42,046	222,439	298,297
All other	16,484	21,332	245,685	215,606
Lawn mowers	7,684	19,096	116,569	176,148
Metal-working machinery (including metal-working tools)	8,281,840	.....	63,582,427	.....
Lathes	.....	a825,658	.....	a12,950,736
Other machine tools	.....	a828,089	.....	a8,088,055
Sharpening and grinding machines	.....	a603,844	.....	a4,883,060
All other metal-working machinery	.....	a1,873,248	.....	a18,742,794
Meters, gas and water	34,767	40,128	273,518	371,607
Mining machinery, oil well	103,493	123,572	1,470,521	1,445,457
All other	1,018,026	1,286,616	7,355,163	8,313,575
Paper-mill machinery	163,924	84,401	1,342,645	1,355,866
Printing presses	90,248	106,050	1,400,951	1,050,144
Pumps and pumping machinery	596,163	469,857	4,560,475	4,903,867
Refrigerating and ice-making machinery	143,443	104,296	647,356	1,100,756
Road-making machinery	.....	a70,100	.....	a379,912
Sewing machines	665,457	554,633	4,457,401	6,129,646
Shoe machinery	149,776	120,310	998,376	1,232,996
Sugar-mill machinery	323,945	415,241	9,323,154	10,034,786
Textile machinery	315,292	418,888	2,666,706	3,697,645
Typesetting machines	126,141	161,065	859,154	968,118
Typewriting machines	880,197	592,106	8,336,762	5,771,836
Windmills	100,814	54,070	597,266	892,870
Woodworking machinery, saw mill	44,409	77,199	356,205	699,699
All other	94,699	69,100	737,693	774,573
All other machinery and parts of	3,957,937	3,116,103	31,864,043	31,168,643
Total	$24,135,772	$22,984,551	$189,595,213	$213,107,035

a Not separately enumerated prior to July 1, 1917.

tendency for many months, dropped 50 per cent below the total for March, 1917, and 58 per cent below the high record of June, 1916.

For the nine months ended March, 1918, exports of iron and steel by values showed a gain of 6.7 per cent over 1917. Tonnage commodities fell off 15 per cent, machinery rose 12.5 per cent and machine tools declined 30 per cent. As pointed out in connection with the February statistics, in considering the recessions from the record made in 1917, the fact must be kept in mind that the totals for that year represented enormous increases over any preceding corresponding period.

The value of all exports of iron and steel products in March was $79,366,639 as compared with $111,703,454 for the same month of 1917 and $58,266,144 for March, 1916. For the nine months ended March, 1918, the aggregate was $857,868,058, as compared with $803,900,523 for the same period of 1917 and $413,377,209 in 1916. Exports of machinery in March were valued at $22,984,551 as compared with $24,135,772 for the same month a year ago. The highest total previously recorded was that in December, 1917, when machinery shipments were valued at $30,051,092. For the nine months ended March, 1918, the exports of machinery were valued at $213,107,035, as compared with $189,595,213 for the same period of 1917. Shipments of metal-working machinery in March aggregated $4,130,839, as compared with $8,281,840 for the same month of 1917. For the nine months ended March, 1918, the machine tool exports totaled $44,664,645 as compared with $63,582,427 for the same period of 1917. Details of the exports of machinery in March, 1917 and 1918, and for the two nine months' periods are given in the accompanying table.

Imports of Iron and Steel

	March		Nine Months	
Imports of Iron and Steel	1917 Gross Tons	1918 Gross Tons	1917 Gross Tons	1918 Gross Tons
Ferromanganese	5,324	3,555	61,059	20,807
Ferrosilicon	977	337	95,213	5,173
All other pig iron	1,104	90	27,454	16,068
Scrap	26,809	3,849	157,163	55,574
Bar iron	158	189	4,148	2,299
Structural iron and steel	54	63	730	6,721
Steel billets without alloys	1,879	1,888	6,147	30,216
All other steel billets	581	921	9,355	6,745
Steel rails	193	1,235	11,209	7,611
Sheets and plates	181	289	1,586	1,916
Tin and terne plates	21	....	574	32
Tin scrap	....	453	....	6,096
Wire rods	....	1,443	2,063	2,877
Total	37,281	14,312	376,701	162,135
Imports of Manganese, Ore and Oxide				
Manganese, ore and oxide of	56,394	19,300	485,018	431,718

Exports for which quantities are given aggregated but 382,195 gross tons in March, 1918, as compared with 606,560 tons for the same month of 1917. The high record for this movement was made in December, 1917, when the shipments aggregated 656,044 tons. For the nine months ended March, 1918, these exports totaled 4,376,766 gross tons as compared with 5,144,743 tons for the corresponding period of 1917. The accompanying table shows the exports for March and for the nine months ended March, 1918, as compared with 1917.

Imports of iron and steel in March, 1918, amounted to slightly less than 40 per cent of those for the same month of 1917, the total being 14,312 gross tons as compared with 37,281 tons. Imports have been steadily declining since last July, and the figures for the nine months ended March, 1918, show a total of but 162,135 gross tons as compared with 376,701 for the corresponding period of 1917. Imports of iron and steel and of manganese for March and for the nine months of 1917 and 1918 are shown in the accompanying table.

W. L. C.

Babcock & Wilcox, Ltd., Farrington Street, London, E. C., with English works at Renfrew, has organized a subsidiary company and made arrangements for the manufacture in Spain of water-tube boilers, etc. The English company is distinct from Babcock & Wilcox Co., New York.

The Chicago office of the Clarage Fan Co., Kalamazoo, Mich., is now located at room 1666, Conway Building. Gardner J. Thomas is manager.

Turbo-Electric Drives for Battleships

In a paper presented before a joint meeting of the Electrical Section of the Franklin Institute and the Philadelphia Section of the American Institute of Electrical Engineers, Oct. 11, Eskil Berg, General Electric Co., Schenectady, N. Y., dwelt upon the advantages of steam turbines and electric drives for ship propulsion, and commented upon various installations which have been made or are to be made on battleships. It is necessary, he said, in order to have the advantages of the high-speed turbine and at the same time be able to use a low-speed efficient propeller to have some form of reduction gear, and this is what led to the use of electricity.

Electric propulsion he believes best suited to large, high-powered vessels where good economy is desired at two or more speeds, as in the case of warships. In his opinion it was due to the performance of the United States collier Jupiter that the Navy Department decided to install electric propelling machinery in the battleship New Mexico. In this connection he also pointed out that the Navy Department has decided to install electric propelling machinery in six other new battleships requiring, he said, about 33,000 hp. each, and in five large cruisers requiring about 18,000 hp. each.

He laid stress upon the economy of electric propulsion. According to Government reports, he said, the Jupiter is making a speed of 12 knots with a coal consumption of 55 tons per day, which he held to be a record about 35 per cent better than any boat of her size afloat. He also gave the following table comparing the guarantees of the New Mexico, which he referred to as the largest and most powerful battleship laid down by the Navy, having a displacement of 32,000 tons, a designed speed of 21 knots and requiring about 28,000 hp., to the Florida and Utah, equipped with Parson turbines, and the Delaware with reciprocating engines.

Water Rate per Effective Hp. Hr.

	12 Knots	19 Knots	21 Knots
Florida	31.8	24.0	23.0
Utah	28.7	20.3	21.0
Delaware	22.0	18.7	21.0
New Mexico	17.3	15.0	16.4

The greatest competitor of electric drives to-day, he believes, is the high-speed helical gear. In his opinion, however, this method has certain limitations as compared to electric drives. Its manoeuvering qualities are not so good, while noise, which he considers an inherent feature of this type, is, he pointed out, practically eliminated with electric drive. He also held that there are certain mechanical limitations to its use which do not exist with electric drives.

Electrical Coils Taped by Blind Workers

To relieve the labor shortage, the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., is having the coils for some of its electrical apparatus wound with insulating tape by blind workers. This practice was inaugurated last fall, and at the present time seven persons are engaged in finishing the coils. It is stated that the results are satisfactory so far as quality is concerned, although naturally, on account of the newness of the work, it is not performed as rapidly as it would be by those who have not been deprived of their eyesight. It is expected that this obstacle will be overcome as the workers become more proficient and the number employed will be materially increased.

So great has been the impulse to chromite mining in California as a result of the war that at present there are 18 firms operating, constructing or preparing to build concentrating mills to treat such ores, says State Mineralogist Fletcher Hamilton. The value of the output in 1917 is said to have been $1,000,000. With the advance in quicksilver, potash, magnesite, manganese and antimony mining, the same authority places the value of the State's mineral output in 1918 at over $140,000,000.

Burning Pulverized Rhode Island Anthracite By-product

Rhode Island anthracite coal is capable of economical utilization in pulverized form, according to tests reported by the Locomotive Pulverized Fuel Co., 30 Church Street, New York. A test was made in connection with a 465-hp. Stirling boiler which was being regularly operated with pulverized Pennsylvania anthracite. About six tons of Rhode Island anthracite in pulverized form was substituted during the regular operation without any change in the feeding or burning equipment of the furnace or in any operating adjustments. No difficulty was experienced. A test was then made under the same boiler to determine relative combustion and boiler efficiency with the Rhode Island coal, and the accompanying table shows a comparison of the use of the Pennsylvania anthracite and Rhode Island anthracite coal under approximately like equipment and operating conditions. With the Rhode Island coal there was a greater accumulation of ash in the slag pit, and the relatively low boiler horsepower was due, it is stated, to the use of feeders of too small capacity for a high ash coal.

The Rhode Island coal was a by-product from the Cranston mine on a tract of about 400 acres immediately south of Providence, being worked for graphite. The coal was mined near the surface and is not regarded as good as the average. Before preparation it had been lying on the ground exposed to the winter weather, and contained about 18 per cent moisture. Less difficulty was experienced in eliminating this moisture by mechanical drying than obtains with Pennsylvania anthracite. The analysis of the coal is given in the table.

Results of Comparative Pulverized Fuel Test

	Pennsylvania Anthracite	Rhode Island Anthracite
Kind of coal	Birdseye	By-product from graphite mine
Duration of test	Continuous operation	4 hr. 20 min.
Average boiler pressure, lb.	141	140
Factor of evaporation	0.978	0.991
Horsepower developed	460.0	386.5
Total fuel used, lb.	46,096	8,721
Total water evaporated, lb.	388,356	58,300
Water apparently evaporated per pound of coal, lb.	8.42	6.68
Water evaporated from and at 212 deg. Fahr. per pound of coal, lb.	8.28	662
Vacuum in combustion chamber, in.	0.15	0.15
Operation of furnace	Good	Good
Smoke	Light gray	Light gray
Boiler efficiency, per cent	67.6	68.8
Fuel analyses:		
Moisture, per cent	0.92	0.42
Volatile, per cent	6.82	6.65
Fixed carbon, per cent	74.55	62.33
Ash, per cent	18.63	30.60
Sulphur, per cent	....	0.82
B.t.u. (calculated—dry)	11,880	9,785
Fineness: through 100 mesh, per cent	98.00	99.00
Fineness: through 200 mesh, per cent	90.00	93.00

J. E. Muhlfeld, president Locomotive Pulverized Fuel Co., believes that with the means and methods now developed there is no reason why this Rhode Island anthracite should not be mined on a commercial basis and utilized to release fuel oil, Pennsylvania anthracite and bituminous coal now being transported by rail and vessel into the New England district for industrial steam generation and heating purposes. With up-to-date equipment, he says, the mining operations already established could be made to yield about 800 tons daily, and on this basis this Rhode Island anthracite can be mined for fuel purposes, and which would supply it in the New England district at a cost substantially below that of the best West Virginia coal for equivalent heat values.

For the purpose of constructing homes for the many workmen employed by the shipyards in Wilmington, Del., and vicinity, if the Government gives them the contract for the work, John E. Healy & Sons, William D. Haddock & Co., A. S. Reed & Brother Co. and the Joseph S. Hamilton Co., all of Wilmington, have formed the Builders' Corporation of Delaware, with $200,000 capital and the same amount of surplus.

Australian and American Prices for Tungsten and Molybdenum

There has been and still is great dissatisfaction among Australian molybdenite, wolfram, scheelite and tungsten mine owners because of the disparity between the prices for the metals in the commonwealth and the prices in the United States. The war-time fixed prices in Australia for these minerals could not be changed, said William M. Hughes, the prime minister, late in February, to a delegation representing mining interests, because of the attitude of the British Government. The delegation submitted a statement to the effect that for a concentrate containing 65 per cent oxide of tungsten the fixed price in Australia was $12.86 per unit at the mines and for each additional unit it was also $12.86. The price of molybdenite concentrate on a basis of 85 per cent molybdenite was $24.35 per unit. In New York, on the other hand, the unit price for wolfram and scheelite ores was about $29.22 on a basis of 62 per cent of oxide of tungsten, while molybdenite was $51.20 a unit on a basis of 85 to 90 per cent molybdenite.

The prime minister's reply was that the British Government was buying all the domestic molybdenite, wolfram and scheelite and was using them for essential war purposes. The Australian Government had tried to secure higher prices for Australian mine owners, but the British Government had refused to pay any more than at present, and there the matter had abruptly stopped. Without those metals a nation could not wage war effectively, and control of Australia's supply of them was essential to Great Britain. Great Britain, he continued, had all the rare metals she needed, and was not concerned with the American supply. "While wolfram and scheelite may be $5,500 a ton in America to-day, they will not be as high as that long. That is very certain," said Mr. Hughes. He declared that prices for the rare metals in Australia were incomparably better for the mining companies than they were before the war. The delegation left with the statement that the rare metal industry would be lost to Australia.

Steel Plant and Blast Furnace Improvements

Arthur G. McKee & Co., consulting and contracting engineers, Cleveland, have taken a contract for the erection of a new power plant for the Ohio Steel Foundry Co., Lima, Ohio. The equipment will include 800-hp. boilers, stokers, coal and ash-handling equipment, two 2000-cu. ft. air compressors, one 500 direct-current generator, condensers, etc. This firm has also taken contracts for changing one of the Hazelton blast furnaces of the Republic Iron & Steel Co., Hazelton, Ohio, from a hand-filled to a skip-filled furnace, and will install at this plant a skip bridge, revolving stock distributor, coke and ore bins, skip and scale cars, bell and hopper and operating rig. Other contracts recently taken include a McKee stock distributor, gas seal, and miscellaneous top changes for the stack of the Zenith Furnace Co., Duluth, Minn.; boiler house with four 400-hp. boilers, coal bins and coal and ash-handling equipment for the Heppenstall Forge & Knife Co., Pittsburgh. McKee & Co. have also taken the engineering contract for remodeling the plants of the Empire Steel & Iron Co., Catasauqua, Pa., and the engineering contract for improvements to the Rockwood, Tenn., furnace of the Rone Iron Co.

Fair progress is being made on the new blast furnace being erected by the Brier Hill Steel Co. at Youngstown, Ohio, Owing to the great delays in receiving materials, and also the shortage in labor, the stack will not be ready for operation as early as expected and will probably not make iron before August or September. The completion of this stack will give the Brier Hill Steel Co. three blast furnaces with an annual capacity of close to 500,000 tons. When the new stack is completed and in operation, the company will probably blow out its Grace furnace and materially enlarge it, bringing it up to the 500-ton per day stack.

Electric Furnaces for Heat Treatment*

Types of Resistance Furnaces—Crankshafts Automatically Treated — Annealing Strip Steel Without Covers—Electric Soaking Pits

BY T. F. BAILY

WHEN electric furnaces for the heating or heat treatment of steel were first put into commercial operation, they were considered interesting developments, but not of commercial value, even by the men who had been pioneers in the introduction and use of electric furnaces for steel melting. The attitude of these men was that while it was of great advantage to produce steel in an electric furnace, because the desired quality could be obtained more readily and with greater precision, so far as electric furnaces for the heat treatment of steel were concerned, this was such an operation as could be as well handled in fuel fired furnaces and at a greatly reduced cost.

The heat treatment of steel and the advantages to be obtained thereby, were not, at that time fully understood by steel makers, and it was some time before even the makers of electric steel realized that if they were to obtain the results desired in the finished castings or forgings produced from such steel, the steel must have accurate treatment, which they were unable to obtain in the fuel fired furnaces they were able to build. It was finally acknowledged by steel men generally that if uniformity in the treatment was to be obtained, the electric furnace was the only type with which this treatment could be accomplished readily and with certainty.

Of the types of electric furnaces applied in the steel industry, only two have established for themselves a definite place—the arc furnace in the melting of steel, where high furnace temperatures are required; and the resistance furnace in the subsequent operation of the heat treatment, where great accuracy and exactness of temperature control must be maintained. The latter became readily accepted as the only commercial type and it is with this type that this paper will deal.

The resistance electric furnaces have the usual fire brick walls and insulating material enclosed in steel frame work. The resistance elements, located entirely within the furnace chamber, are rectangular in cross section and run the entire length of the furnace, or, in the case of circular furnaces, entirely around the furnace. This trough is composed of a carbide of silicon material bonded with the usual binding materials. The electrodes for leading the current through the furnace walls are of carbon or graphite. The resistance material is laid in the refractory trough mentioned and is composed of broken carbon or graphite. The current flows from electrode to electrode through this carbon resistor, which heats up in the manner of the ordinary carbon filament lamp, the heat radiating from the carbon and the trough heating the furnace chamber, and, in turn, the material to be heated. The control of the heat input is obtained by means of various voltages from the secondary of a special transformer, a relatively definite number of kilowatts being obtained from each of the various voltages.

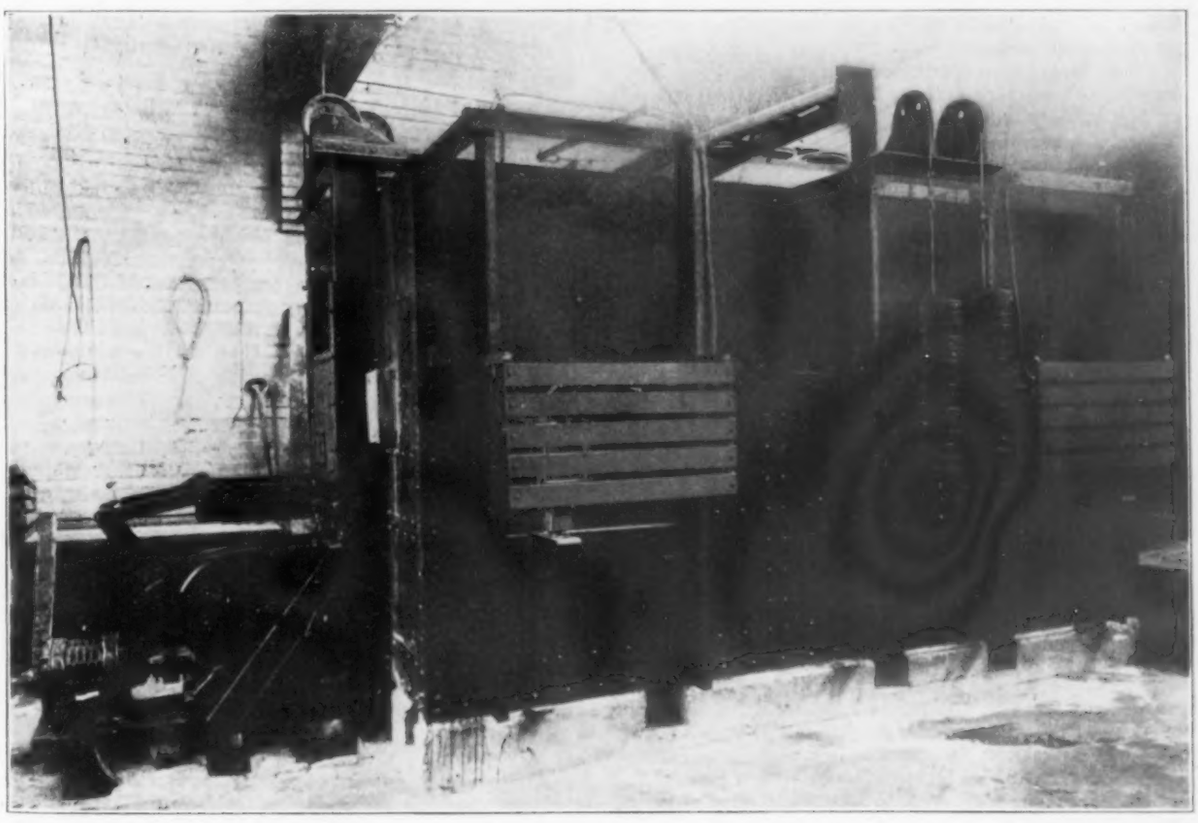
Commercial Types Now In Use

The following are the types of furnaces that have been put into commercial operation:

Hearth type annealing furnaces adapted to small capacities for the heat treatment of gears and similar parts.

Car type annealing furnaces for handling heavier material than can readily be handled in the hearth type furnaces.

*From a paper presented before the Cleveland Section of the Association of Iron and Steel Electrical Engineers, April 27. Mr. Baily is president of the Electric Furnace Co., Alliance, Ohio.



Electric Furnace for Heat Treating Finished Automobile Parts of Alloy Steel at the Erie Specialty Co., Erie, Pa. It is a 130 kw. furnace with a capacity of 2800 lb. per hr.

Pusher type furnaces, where the material can either be readily pushed in the usual manner, or, in the case of small parts, placed in containers that can be treated in the same manner.

The hearth type furnace, whose electrical capacity is 40 kw., has a capacity for heating 200 lb. of steel to a temperature of 1620 deg. Fahr. in one hour, with a current consumption of not to exceed 400 kw.-hr. per ton of metal heated. The accuracy of temperature control is such that a maximum variation of 5 deg. Fahr. in the treatment can be readily obtained. This current consumption is such that from a mere fuel standpoint electric furnace operation is more expensive than with oil or gas, but the precision with which the temperature can be controlled, and the ease with which the control is accomplished, are such that the higher fuel cost is more than compensated for by the certainty of producing material of the highest quality.

As the size of the furnace increases, the fuel economy increases, as is usually the case with all furnaces; but, on account of the precision in treatment, and consequently the higher quality of material produced, as well as the elimination of rejections due to imperfect treatment, the extra cost of electric power for furnace operation is again offset, due to the higher quality of material produced.

It is, of course, to be admitted that substantially equal results to electric furnace treatment can frequently be produced by operators of fuel fired furnaces, if great care is exercised by exceptionally competent men, but these cases are unusual, especially in times like the present, and electric furnaces, due to the ease and simplicity with which they can be controlled, show marked superiority in commercial operation over any other type of equipment.

The Car and Pusher Type

The first of the car type furnaces put in operation some years ago had a hearth 4 ft. wide and 10 ft. long, an electrical capacity of 150 kw., and a heating rate of 12 tons in 24 hr. The current consumption of a furnace of this type, when heating to 1650 deg. Fahr. does not exceed, when operating at capacity, 300 kw.-hr. per ton of metal heated. This type of furnace is used almost entirely for annealing, the various furnaces of this size which are in operation being used for annealing motor car parts, locomotive axles, and steel castings and forgings, as well as non-ferrous metals, such as aluminum and copper.

The larger size furnace of the same type has a hearth 6 ft. wide and 18 ft. long, an electrical capacity of 300 kw. and a heating rate of 24 tons of metal per day of 24 hr., the current consumption, when operating at full capacity, being under 275 kw-hr. per ton of metal heated to the usual annealing temperature.

Of the pusher type furnaces, the smaller type having a capacity of 800 lb. per hour, an electrical capacity of 130 kw. and a hearth 12 ft. long and 30 in. wide and adapted to handle material in pans has been largely used for small parts for airplane and similar applications, where the highest degree of precision in the treatment is required, and this type has usually been equipped with time actuating devices, so as to eliminate any variation in the handling of the material in and out of the furnace.

It is, of course, essential that oxidation of the finished parts be completely eliminated, and in this type of furnace there is no oxidation whatever, the material coming out of the furnace being as free from oxide as on entering. In one furnace this is carried out without difficulty in treating parts the tolerance of which are from two to three thousandths of an inch.

Automatic Treatment of Crank Shafts

The electric heating furnaces that have, perhaps, attracted the widest attention, are a type built some years ago for the treatment of cast steel drawbar knuckles, and are now being used for the heat treatment of crankshafts for automobiles and airplanes.

A heat-treating equipment of this kind consists of two furnaces, each having a hearth 20 ft. long and 7 ft. wide. Located between the discharge end of the first furnace and the charging end of the second furnace is a hydraulically operated manipulator for removing the heated material from the first furnace, quenching it in the quench bath and placing it on the charging platform of the second furnace. A pair of furnaces of this character have a capacity for heat treating 72 tons of steel per day of 24 hr., the first furnace having an electrical capacity of 600 kw. per hour, and the second furnace 300 kw. per hour. The precision in the treatment obtained by these furnaces has been very gratifying and a maximum variation in temperature of less than 10 deg. Fahr. has been readily maintained in actual practice over long periods of operation. In this connection it is interesting to note that one of these units recently operated for over eight months, during which time more than 14,000 tons of steel were heat treated, and there was not in a single piece a rejection due to the heat treatment.

These furnaces are automatically controlled by contact making pyrometers, which, in conjunction with a special electrically operated valve pulpit, control all the operations of the furnace. The pyrometer couples located in the discharge end of the furnace holding the material about to be removed, are dominated by the temperature of the material itself, so that the process of operation is that when the material at the discharge end has reached the temperature required, the pyrometer couple actuates the pyrometer instrument, which, in turn, through suitable relays, sets in motion the valve pulpit device, which in proper sequence raises the door of the charging furnace, swings the manipulator platform under the door of the furnace, and by means of the pusher pushes in a fresh charge of material at the same time discharging on to the manipulator platform the material located under the pyrometer couple which starts the operation, and when it has become centered on the charging platform, it is removed by the manipulator from the furnace and plunged into the quenching bath simultaneous with the closing of the door, the pusher having, of course, been previously withdrawn from entering into the furnace.

At this period of the operation a time element device is thrown into circuit, which holds the material being quenched into the bath a definite time, after which the manipulator raises the material out of the quench and places it in front of the charging platform of the second furnace, where it remains at rest until the pyrometer mechanism of the second or drawing furnace puts into motion a similar operation to that just described, on which the heat treated material is discharged from the second furnace.

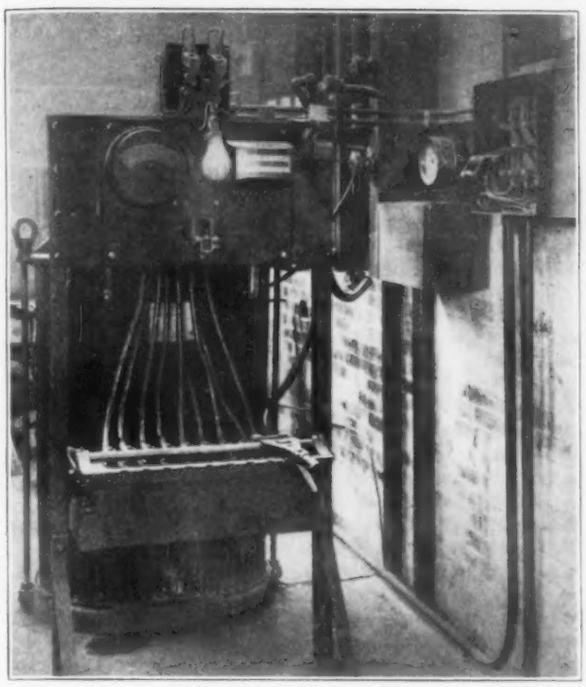
Pusher Furnace for Shell Billets

Of the new types of furnaces that are now being put into operation, one of the most interesting is a furnace of the pusher type for the heating of shell billets preparatory to forging. The first of these furnaces has an electrical capacity of 600 kw., a hearth 6 ft. wide x 8 ft. long, and a capacity for heating 2½ tons of 3¼-in. round billets to a temperature of 2100 deg. Fahr. per hour. A similar furnace of 300 kw. capacity with a hearth 3 ft. wide and 8 ft. long has a heating capacity of 1¼ tons per hour when heating to the same temperature. The current consumption of these furnaces is 240 kw.-hr. per ton on the larger furnace and 275 kw.-hr. per ton on the smaller.

The advantages to be gained by the use of electric furnaces for billet heating are the elimination of scale from the forging and accuracy of heating, offsetting the higher cost for actual fuel. Particularly in shell forging is even heating advantageous, as uneven heating preparatory to the piercing operation is the principal cause for eccentricity, causing the rejection of the forging. The elimination of scale has also the advantage of increasing the life of the dies and the saving of the time now required for cleaning the forging with wire brushes after it has been withdrawn from the furnace, and before it is put into the press.

Unusual Results on Strip Steel

Another development is a continuous furnace of the car type for the annealing of cold rolled strip steel. This type will find extensive use in the sheet mill industry. This furnace has an electrical capacity of 600



The Switch and Automatic Control Device for the Electric Heat Treating Furnaces Shown in the Other Illustration

kw. per hour, and is adapted to take packs up to 20 tons each per car, and will have a heating rate of 150 tons of steel per day. The current consumption in this instance is exceptionally low, as compared with the other furnaces mentioned, amounting to less than 120 kw.-hr. per ton of metal annealed. This is accomplished by making the furnace recuperative, which is done by providing two lines of cars running through it in opposite directions. The heated part of the furnace is in the middle, and the cars and their material when they have reached their full temperature and are passing out of the furnace through the recuperative chamber give up a great portion of their heat to the incoming material on the cars passing in the opposite direction. The fact one of the most expensive items in the annealing of atmosphere at all times enables the packs of steel to be annealed without the use of covers, which, of course, is one of the most expensive items in the annealing of sheets by the present method. In a furnace of this character and size the cost of current is substantially the only cost in the entire annealing operation.

Electric Soaking of Hot Ingots

Of the types of electric furnaces that have as yet not been developed is the pit type furnace for the soaking of hot steel ingots, and while the heating of cold ingots by electricity will, perhaps, never be commercially feasible, excepting on materials of exceptionally high quality, the use of electric soaking pits for hot ingots, will, I believe, in the next few years become very general, if not universal. This is due to the fact that substantially only the heat necessary to maintain the furnace itself at the proper ruling temperature is required, the hot interior of the ingots heating up the exterior, as is the practice in the well known Gjers pits. The essential difference between electric pits and the Gjers pits is that instead of the heat for maintaining the furnace being abstracted from the ingot itself, it is supplied from the electric heating elements. This feature offsets the disadvantage of the Gjers type pit and will make it possible to produce ingots all parts of which are within a few degrees in temperature.

The current consumption in a large pit having a capacity for holding sixteen 3-ton ingots will not exceed, if the ingots are stripped hot, 15 kw.-hr. per ton when operating on a one-hour soaking period, or 30 kw.-hr. per ton when operating on a two-hour soaking period. It is, of course, essential, if the highest economy is to be obtained in this practice, that the ingots be put into the pit as soon after casting and stripping from the molds as possible, the current consumption for colder ingots increasing so that if entirely cold ingots were charged, the capacity of the furnace would not only be reduced, but the current consumption would increase to as high as 200 kw.-hr. per ton.

It is readily apparent that even for fuel consumption when operating as stated, with hot ingots, electricity would probably compete in actual fuel cost with any gas fired soaking pit, and besides this there would be the advantage of freedom from scale, and there would be an evenness of the ingots that is not now regularly or usually obtained. This evenness in temperature would be a big advantage over other practice, as many of the rolling mill troubles can be directly traced to the soaking pit.

Never in the history of the steel industry has the necessity arisen for such great accuracy in the production of materials, and obtaining at the same time the greatest possible production. In the past it has been the practice generally to sacrifice quality for production; but the steel industry has at last come to the realization that a poor quality of steel and the poor treatment of that steel, even if temporarily commercially feasible, is not economical. At present in the production of essential war materials both quality and quantity in the making of steel and its treatment must be observed, and in the years of peace that it is hoped will follow these standards must still be maintained. Electric furnaces in this work have their place, and for the fields to which they are adapted they will become essential to the maintenance of these high standards.

The Centrifugal Compressor for Cupola Blowing

Discussing the centrifugal compressor for cupola blowing in a paper prepared for the meeting of the American Foundrymen's Association held in Boston, J. A. Shorey, General Electric Co., New York, urged that oxygen be regarded as a definite element of the cupola charge and regulated in its passage through the charge with equal precision both with regard to rate and uniformity of distribution. In this connection, he emphasized that in a usual charge the air by weight represents approximately 80 per cent of the coke and iron together. For best results he believes that not only an exact rate of combustion of the fuel and melting but a uniform rate, which he said is absolutely dependent upon a supply of air of correct weight, the uniformity of its distribution in its flow through the charge and freedom from pulsation effect, is necessary. This he held possible with a centrifugal compressor or direct-driven fan. A belt-driven fan, because of belt slip, he believes, will not deliver a uniform flow of air. Also the low efficiency which he attaches to fans operating on pressures of 15 to 16 oz., in his opinion, makes their use for this service in many cases inadvisable.

Power input diagrams, he said, indicate that the input to the blower of the positive type is constant regardless of the load whereas the input to the centrifugal compressor is proportionate to the load, which, it is his belief, effects a large saving in operation. He held the centrifugal compressor an ideal machine for cupola blowing, embodying the elements of simplicity, high efficiency, minimum attendance and low upkeep and also delivering an air stream of great stability.

W. E. Moore & Co., consulting engineers, Union Bank Building, Pittsburgh, are making plans for the erection of a new plant for the Gas Tank Recharging Co. of Keokuk, Iowa. There will be two main steel buildings, one 60 x 200 ft. to contain the calcium carbide plant, and the other 45 x 120 ft., which will be the can factory. The buildings will be erected by the Worden-Allen Co., Chicago. The plant will contain lime kilns, coke ovens and a can factory. The contract for the conveying machinery has been placed with the Lidgerwood Mfg. Co. of New York.

Gaston, Williams & Wigmore, Inc., exporter and importer, has moved to the new building of the company at 39 Broadway, New York.

ELECTROLYTIC PICKLING

Wrong Conclusions from Its Improper Application to Steel—Comparison with Chemical Process

EXCEPTIONS have been taken by Dr. Carl Hering, of Philadelphia, to certain statements regarding the electrolytic pickling of steel, made by Prof. M. De Kay Thompson and F. W. Dodson in *Metallurgical and Chemical Engineering*, Dec. 15, 1917. Part of Dr. Hering's communication to the same paper is as follows:

Prof. M. De Kay Thompson and F. W. Dodson have described some tests which they made comparing electrolytic pickling with chemical pickling. They used black sheet iron and found that the surface after electrolytic pickling was much better and was a silvery white and very clean while that treated by the usual chemical process was not so clean, but was covered with fine black particles which did not wash off easily but which could be removed by rubbing. On this basis they compared the amount of acid and iron in the final solution and then drew their conclusion.

This is on its very face an unfair comparison and misleads those who may be interested in the process, for it is evident that the chemical pickling had not been carried far enough to remove all the scale, and if it had been there would necessarily have been a much greater amount of acid and metallic iron consumed than they found. To rub and rewash the iron in large works would increase the cost greatly, but in their academic tests they entirely neglected this important additional cost.

Advantages of Electrolytic Process

One of the chief advantages of the electrolytic process is that all these deep-seated black particles can be dissolved off without dissolving any appreciable metallic iron and without uselessly consuming the corresponding acid. With the chemical process the most wasteful consumption of metallic iron and the corresponding acid takes place just when these deep-seated black particles are being removed, if indeed the process is carried so far, as that leaves the surface deeply pitted. Had they carried the chemical pickling far enough to remove all the oxide to the extent to which it was removed electrolytically or even only approximately, their consumption of metallic iron and acid would have been far greater.

Moreover, in the chemical process they filtered off the scale so that no acid would be consumed in dissolving it. This is academic, as it is not done in practice and would be quite expensive. While the scale is not directly soluble chemically in sulphuric acid, yet when reduced by hydrogen it becomes soluble; and as the agitated liquor is always full of hydrogen considerable of the removed scale in the bottom of the vat no doubt is ultimately dissolved, thereby consuming additional acid quite uselessly, as the object of the pickling had then been accomplished.

Furthermore their acid for chemical pickling was stronger than what I was informed was used in practice, while for the electrolytic process it was weaker than what it should have been; both give undue favor to the chemical process and are therefore unfair and misleading.

Current Densities

That they did not carry out the electrolytic process properly, and therefore got wrong and misleading results, is shown by the very low current densities they used, and it was for this reason that the iron was not sufficiently protected by the current and may have been partly dissolved, thereby also uselessly consuming acid.

One of the important features about the electrolytic process is that the high current density prescribed protects the clean iron from being dissolved. I have treated a cleaned piece of iron electrolytically at the proper current density about 15 times as long as it takes to clean it and yet found that it had lost practically nothing in weight, while treated proportionately long by the chemical process the sheets would probably have had actual holes eaten through them. Had they carried out the process as prescribed in the patents they should not have lost an appreciable amount of metallic iron. Moreover, the higher current density would no doubt have also reduced the time required; but even so, when the scale was thick they found it took only 8 min. as against 2½ hr. for the chemical pickling.

In a letter to the writer Professor Thompson states: "I think there probably is very little metallic iron dissolved in the electrolytic method, but we did not determine this." Unfortunately his article gives quite the contrary impression. He adds: "Perhaps it should have been stated (in the article) that no attempt was made to distinguish between the two sources of dissolved iron," meaning whether it had been useful metallic iron or useless scale.

They used the lower current density because they claimed to have found the current efficiency to have been greater then. This is academic; the current in the electrolytic process is but a small item of the cost, while the metallic iron lost, with the corresponding acid, is a large item. The commercial man rightly looks after the dollar; to save a little in a cheap item and thereby lose a lot in an expensive item is not good practice, even though it may appear to be better academically.

It is manifestly not fair to the electrolytic process to conclude from the iron found in solution afterward that this was originally metallic iron, which is certainly the impression they give when they say that "the amount of iron dissolved was 2.88 grams," or such-and-such per cent of the original oxidized sheet. When properly carried out the iron in solution comes from the scale alone, while in the chemical process it necessarily was nearly all good metallic iron, as they say they filtered off the scale which drops off by dissolving the iron underneath.

Academic tests can be very misleading and deceiving when proper consideration is not given to the factors which are of chief importance in the industrial applications.

Manipulating Slags in Electric Steel Furnaces

F. T. Snyder, inventor of the Snyder electric furnace, has been given a patent (U. S. 1,254,078—Jan. 22, 1918) on a steel-making process in which the slag employed for taking up the impurities from the bath is not removed from the furnace at the end of a heat, but is retained in the furnace as the initial slag of the next succeeding heat, obviating the necessity of preparing a fresh slag. Later this slag is removed and a new one added to the partly purified bath. In this way each heat is subjected to the action of two distinct slags; during the first period, to the action of an old slag, consisting of the final slag of the last preceding heat, and during the second period to the action of a fresh slag added to the bath after it has been partly purified by the old slag. A tilting electric furnace is recommended. The process is claimed to be economical because rapid in operation and utilizing to a high degree the heat developed in the furnace and requiring less than the usual time and amount of basic slagging material. The retained final slag may contain 53 per cent lime and 25 per cent iron oxide as compared with the usual slag taken off a finished heat, which contains less than 10 per cent iron oxide. While the steel tapped from beneath this final slag will be in an oxidized condition, it is preferred to finish it after it has been tapped from the furnace.

The first launching of a wooden ship for the Emergency Fleet Corporation on the Great Lakes took place at Sturgeon Bay, on Green Bay, Lake Michigan, on Thursday, April 25, when the army transport "Sturgeon Bay" slid down the ways of the shipyards of Rieboldt, Wolter & Co.

THE HOUSING BILL

Substantial as Well as Temporary Homes Allowed—Competitive Bidding Required

WASHINGTON, May 7.—The housing bill, carrying $60,000,000 to provide living accommodations for workers at munition plants and other establishments having Government contracts, passed the Senate on May 2, with a number of important amendments of the original House measure. The members of the conference committee to which the bill was at once referred are in substantial agreement on the measure, having accepted practically all the Senate modifications. The conference report will be adopted and the bill signed by the President in the present week, thus making the big appropriation immediately available. Director Otto Eidlitz, who will direct disbursement of the funds provided by Congress, has already perfected a large organization to carry out the work, and within the next 90 days a large amount of housing will be actually completed.

The bill now provides that "houses erected by the Government under authority of this act shall be of only a temporary character except where the interests of the Government will be best subserved by the erection of buildings of a permanent character." This will permit the construction of temporary dormitories at emergency plants and of substantial houses in the vicinity of establishments that will continue to operate after the war. It is estimated that the Government will save in this manner one-half the total investment under the authority of the bill.

In view of the broad scope of the measure, which enables the Government to lease, purchase, or commandeer land, buildings, etc., wherever necessary, the Senate insisted that the power granted by the bill should cease with the termination of the war "except the power and authority to care for, sell or rent such property as remains undisposed of and to conclude and execute contracts for the sale of property made during the war." After discussion, this clause was amplified by the addition of another amendment to the effect that "such property shall be sold as soon after the conclusion of the war as it can be advantageously done." The conference committee promptly accepted these amendments.

No Cost Plus Percentage Bids

A spirited debate marked the consideration of Section 7 of the housing bill, which, as passed by the House, provided that "no work to be done or contract to be made under or by authority of any provision of this act shall be done or made on or under a percentage or cost-plus percentage basis, nor shall any contract be let until at least three responsible, competing contractors shall have been notified and considered in connection with such contract." Senator New of Indiana, argued that under the lump-sum contract, no contractor can possibly make a bid until he is supplied with plans and specifications for the job, which must be furnished by the architect. "I say to the Senate," he continued, "that for a project involving the expenditure of a million dollars it will take not less than three months, and more likely nine months, to prepare plans for that kind of a building project. The form of contract that was recommended by the committee of the Council of National Defense provides for the cost-plus plan, limited, however, by an upset fee in every case. The fees allowed the contractor, in other words, run from 7 per cent on the smaller jobs to 2½ per cent on the larger jobs. No bank would finance a building contractor who could show to the bank that he had only figured on a profit of 2½ per cent or less to himself or to his firm.

During the debate it developed that Director Eidlitz has strongly recommended to the House and Senate committees the adoption of a system which, while barring cost-plus contracts, would allow the Government to negotiate with any responsible bidder and award a contract for a fixed fee, the Government, however, paying the entire cost of materials, labor, supervision, etc. After further discussion the Senate decided to add to the House provision an amendment requiring contracts to be awarded to the lowest responsible bidder, the provision as adopted reading as follows:

> That no work to be done or contract to be made under or by authority of any provision of this act shall be done or made on or under a percentage or cost-plus percentage basis, nor shall any contract be let until at least three responsible competing contractors shall have been notified and considered in connection with such contract, and all contracts to be awarded to the lowest responsible bidder, the Government reserving the right to reject any and all bids.

The conferees are in practical agreement upon this provision as adopted by the Senate.

The officials who will have charge of the housing plan are by no means satisfied with section 7 as it does not give them the authority they desire to place contracts without competition with a view to hastening construction. It is argued that if there is to be competition it will not be possible, in certain cases, to begin the work until the plans and specifications have been completed. It may frequently happen, it is declared, that the "lowest responsible bidder" may not be able to expedite the work as much as is desired, although the time limit embraced in his proposal may not be unreasonable to such a degree as would warrant the officials in rejecting his bid.

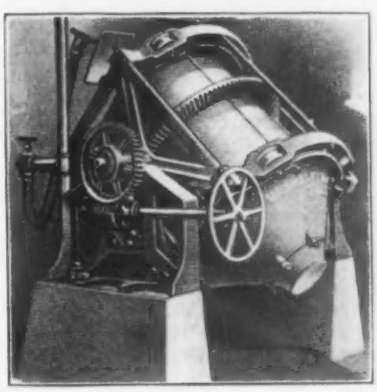
The housing officials will endeavor to make the best of the measure as finally passed and expect to break ground for construction in a dozen different places within a fortnight after the bill receives the President's approval. Half a dozen types of buildings are in contemplation, including small dwellings, detached, semi-detached and in rows, dormitories, boarding houses, etc.

W. L. C.

A Revolving Non-Ferrous Melting Furnace

A melting furnace for non-ferrous metals of the revolving tilting type employing fuel oil or gas to produce the heat required has been brought out by the U. S. Smelting Furnace Co., Belleville, Ill.

The material to be melted is put through the charging hole and the burner which swings to one side to permit the furnace to be charged is adjusted and lighted. A steady, intense flame is projected through the center of the melting chamber but, it is pointed out, not directly on the metal, the reflected heat from the lining of the furnace being relied upon to bring the charge to the melting point quickly.



Non-Ferrous Metals for Ingots and Castings Are Placed in a Tilting and Revolving Smelting Furnace, Which Does Not Use Crucibles and in Which the Flame Supplying the Heat for the Smelting Is Not Projected Directly on the Charge

The furnace is put in rotation after the burner has been lighted, thus keeping the metal in motion while the lining of the chamber, which has been heated by the burner, passes underneath the metal. This, it is pointed out, eliminates freezing of the metal to the sides of the chamber, as well as causing the impurities to be freed and taken up by the flux.

As the furnace revolves it is possible for the tender to observe the condition of the metal through the charging end. When this operation is completed the furnace is tilted to the pouring position shown by a turn of a hand wheel and the metal passes out through the cone-shaped pouring end.

CAST HIGH SPEED STEEL TOOLS

Results of the Use of Three Different Grades of French Alloys

THE *Revue de Metallurgie* (Paris) has a most interesting article by M. Grennet on the use of tools of high-speed steel in the cast condition. It is another evidence of the constant efforts made in France to augment production, and is of value to us as an example in pointing out possible ways of increasing our own production. These experiments were carried out at the Firminy steel works, and the most interesting results were obtained on three grades of material: Extra hard steel, hard steel and normal steel.

The extra hard steels had the following composition:

	Per Cent
Carbon	2.7
Chromium	19.4
Tungsten	24.9
Vanadium	0.4

This alloy was cast in rectangular steel chill molds 10 mm. wide, 15 mm. deep. The top surface showed a line of piping which was found to be 5 mm. deep. It is the lower part, the part cooled the most thoroughly, which is used for the cutting edge. As cast such an alloy is feebly magnetic and very brittle; it falls to pieces while being ground. It cuts glass with the greatest ease. When annealed for two hours at 550 deg. C. it is much less brittle, can be ground, and at the same time is slightly more magnetic.

With a tool prepared in this way it has been found possible to turn a round piece of quenched chrome-nickel steel, 40 mm. diameter for 15 min. The steel bar was quenched and slightly reheated, with a Brinell hardness of 550, and the speed was 200 revolutions per minute, the depth of cut two-tenths of a millimeter. With the Triple Eclair high-speed steel made at Firminy the greatest possible speed was 30 revolutions per minute. This hard and brittle alloy, brittle even after annealing, can only be used after taking the greatest precautions, and it has not been found possible to use it continuously. If the annealing is carried out above 550 deg. C. the brittleness is greatly reduced; but the cutting qualities, at least for very hard steel, diminish rapidly.

The hard steels had the following composition:

	Per Cent
Carbon	1.2
Chromium	6.6
Tungsten	23.0
Vanadium	0.8

This steel has been used cast in steel molds 20 mm. square, or in rectangular molds 20 mm. x 15 mm. The mold was horizontal and, as before, the lower part was taken for the cutting edge. After casting the tools were subjected to an annealing at 525 deg. C. for two hours, which lessened the brittleness.

Such tests as have been made have shown that these tools allow greatly superior speeds to the best forged high-speed steels, but it has not been possible to push the tests to the limit as the lathes were not powerful enough. When working on the rough turning of 155 mm. shells before quenching these tools stand up without being reground four to ten times longer than the best forged high-speed steel. The turning of the same size shells after quenching gave the following results: It was possible to machine a lot of 70 shells, at the usual speed, which could not be worked with the forged high-speed steel. This steel is, therefore, very interesting, although special precautions must be taken to guard against brittleness. It is on this grade of steel that the largest number of tests have been made.

The normal steel analyzed as follows:

	Per Cent
Carbon	0.7
Chromium	3.5
Tungsten	19.0
Vanadium	0.8

This composition is almost the same as that of the Triple Eclair steel made at Firminy. On the shell steel the cutting speed of these cast tools is not greatly superior to that of the forged tools. The number of grindings necessary in service were less (about one and a half times) than for the forged steel. These steels can be used as cast, and if they do not have the great hardness of the more highly carburized steels they are advantageous because of their relatively low brittleness. This grade of steel is of the readiest application at the present time. If it is found that annealing is necessary, then 500 deg. C. should be used.

Under the heading of general remarks it is noted that these cast tools could not be made too large or they would not quench throughout their cross section. The largest that have been made have been 30 mm. in cross section. This size in the hard and normal grades was less resistant than the 20-mm. size, but still superior to the forged steel. With the extra hard grade only small tools have been cast 15 x 10 mm., because with a greater size the structure is very coarse and the tools very brittle.

The greatest care should be taken to have a good surface on the cast steel, so that grinding can be reduced to the minimum. For the best results the surface of the steel should be scarcely whitened with the wheel. Manganese is very harmful, and 0.5 per cent is enough to spoil the tool.

It would seem that these cast steels will certainly find a place in modern practice. They have not yet been sufficiently studied, however, to find out the best composition, shape of cutting edge, etc. At present only those are used which approach in quality the forged steels and which can be easily adapted to present drop practice. It seems very probable that the reciprocal development of the tools and the machine tools will bring out the advantages of the harder grades over the third or normal grade at present employed.

G. B. W.

Employment Cards Required in New Jersey

Beginning on July 1, every worker seeking employment in the industries of New Jersey will be required to present a card from the State, Federal and Municipal Employment Bureau, showing where he was last employed and for what reason his employment ceased. This is one of the features of a plan by which New Jersey hopes to solve the problem of the shortage of labor. The Manufacturers' Council of New Jersey, acting with the commissioner of labor of the State, worked out the details, which it is hoped will do away with the large numbers of floating workers. Employers will be asked to secure the employees they need through the bureau.

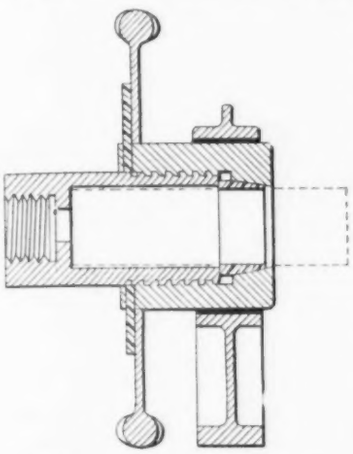
A further part of the plan will place salaried representatives of the manufacturers in each branch of the State Employment Bureau; their duty will be to meet the needs of the plants and factories served by the respective branch. The State Employment Bureau is to be notified by the manufacturer how many employees he needs and through the card system the bureau will be constantly advised of the workers in every section who are unemployed. Thus the plan is to bring the job to the man and the man to the job. Branches of the bureau are already established at Newark and Camden in addition to the offices at the Capitol at Trenton.

The Bosch Magneto Co., whose plants in Springfield, Mass., and Plainfield, N. J., were recently taken over by the Government alien property custodian, has been reorganized with the following new officers: Joseph A. Bower of New York, president; Christian Girl, Cleveland, vice-president; George A. MacDonald, Springfield, Mass., treasurer; William G. Fitzpatrick, Detroit, secretary; A. T. Murray, Allentown, Pa., general manager, and A. D. Altree, New York, assistant treasurer. Domestic business will be carried on as formerly.

M. Clémentel, the French Minister of Commerce, recently presided at the first meeting of the Technical Commission which has been formed for the purpose of standardizing and revising specifications relating to metallurgical products. The Minister insisted upon the importance of measures which tended to increase the output of the works and to facilitate imports.

A Chuck Suitable for Machining Shells

The accompanying drawing shows the general features of a patented chuck manufactured by A. M. Campbell, Brockville, Ontario, particularly for the machining of shells, but of course adaptable to the chucking of disks, plugs and bars. The front end of the chuck runs in a large babbitted bearing to secure rigidity and accuracy. The opening and closing is done by means of a hand-wheel. The operation of the smaller sizes is substantially automatic, closing by momentum as the lathe starts, and opening as it stops. The grip of the collet is proportional to the driving effort of the lathe, and is usually two to four times, it is claimed, what is necessary to drive the shell. As indicated the collet is relatively long and grips throughout its length, and of course serves to center the shell. There are but three moving parts; the collet, the sleeve and the hand-wheel.



The Campbell Shell Chuck

Service Flag Presented

At noon on April 13 all of the employees of the American Tool Works Co., Cincinnati, held a special meeting on the roof of the main building. The occasion was the presentation to the company by the employees of a large American flag and also a service flag containing 100 stars.

Charles Stephens, a foreman, made the presentation address, and he was responded to by President J. B. Doan and Vice-president Robert S. Alter. All speakers referred to the fact that three stars on the service flag represented three sons of General Superintendent A. E. Robinson, one of whom is now in France. In his talk Mr. Robinson heartily thanked the men for their unswerving support and allegiance to the company during the past year. He stated emphatically that their loyalty to the company during the present crisis is unquestioned evidence of their loyalty to their country.

In line with other machine tool builders in Cincinnati, the American Tool Works Co. has arranged to sell its employees Liberty bonds of the third issue on the installment plan.

Government Wants Men for Export-Trade Offices

The Government is looking for men capable of taking charge of branch offices of the Bureau of Foreign and Domestic Commerce, Department of Commerce; also men to act as assistants in such offices. These branch offices are located in the principal commercial cities, the salaries ranging from $1,800 to $3,000 for managers and from $1,200 to $1,800 for assistants. Applicants should write at once to the Bureau of Foreign and Domestic Commerce, at Washington, as a non-competitive examination will be held on May 16 in various parts of the country.

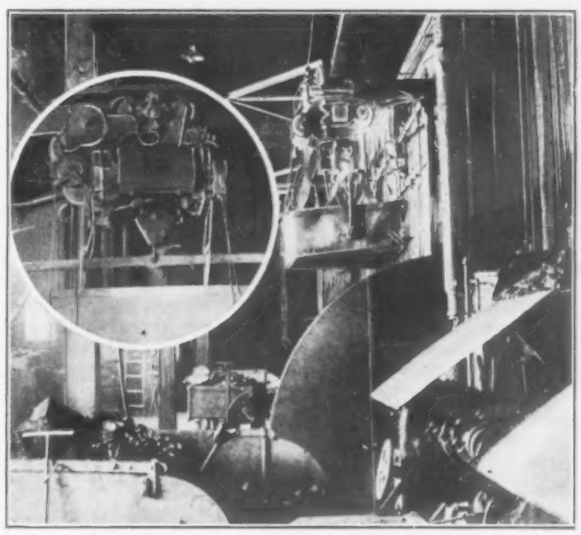
Luigi Baracchini, Via del Ricovero, Livorno, Italy, desires to receive quotations from American manufacturers of screw machines, suitable for cutting screws for airplanes. He would also like to receive catalogs from other manufacturers of mechanical tools in general; also literature from manufacturers of tool steel. He gives the following bank references: Banca Commerciale Italiana, Banca do Sconto and Banca d'Italia, all of Livorno.

Ash Handling in Old Boiler Plant

An improved method of handling ashes in old boiler houses of small or moderate size is in successful operation at the Pennsylvania State College, State College, Pa. An electric monorail hoist is used and approximately 5000 lb. of ashes are disposed of every 24 hr. The hoist was built by the Link-Belt Co., Philadelphia, and is the type used for handling ashes under Taylor stokers. The system of handling is thus:

Every 8 hr. the ashes which accumulate on the dumping grates of the stoker are dumped into a steel tray, 6 ft. 6 in. by 3 ft. 3 in. and 18 in. deep. This tray rests on a four-wheel truck. The truck is then moved on a small-gage track to an opening where the tray is elevated by means of the hoist, and carried to the ash dump, 300 ft. distant. It requires less than 10 min. to dispose of the ashes from under the boilers and return the tray to position for the next dumping of grates.

The operator walks with the hoist and operates both controllers from below by means of cords. The hoist is equipped with a motor-driven trolley. The travel speed along the 10-in. monorail I-beam is 125 ft. to 250 ft. per min. The gears of the hoist are inclosed within metal housings and operate in a bath of oil. The two motors are of Crocker-Wheeler make.



How an Electric Hoist Was Utilized for Handling Ashes in Pennsylvania State College Plant

Brass Manufacturers' Ideas as to Non-Essentials

At the recent spring meeting at French Lick, Ind., of the National Association of Brass Manufacturers, there was considerable discussion in regard to the present depression affecting the brass industry on account of the limited amount of building now being done, and it was decided to present the matter to the attention of the United States Chamber of Commerce.

The report of the committee opposing state master plumbers' exhibits, souvenirs and gratuities was approved and the members pledged themselves not to support by advertising or otherwise such publications as magazines and bulletins of State trade associations, which were placed in the same category as plumbers' exhibits, being regarded as non-essentials.

A poll of the meeting indicated that the average daily wage of employees in the plants reporting was $2.37 in 1915 compared with $3.29 at the present time.

The next meeting is to be held in Cleveland, June 26 and 27.

The former shipbuilding and machinery works of the Samuel L. Moore & Sons Corporation, Front Street, Elizabethport, N. J., now operated by the Bethlehem Shipbuilding Corporation, has under way two 3500-ton freighters and a 5000-ton tank steamer.

Steel Manufacturers Pledge Their Support

Addresses by Judge Gary and Mr. Replogle Followed by General Discussion—Full Report of Recent Meeting Held in New York

The following is a stenographic report of the meeting of steel manufacturers at the office of the United States Steel Corporation, New York, April 26:

JUDGE GARY: Gentlemen, please come to order. I want first to get a record of the companies represented, and by whom.

The following companies, represented by their respective officers as stated below, were present:

Alan Wood Iron & Steel Co., W. W. Lukens, vice-president.
Allegheny Steel Co., Harry E. Sheldon, president, and C. C. McLane, general agent.
American Rolling Mill Co., George M. Verity, president.
Andrews Steel Co., J. B. Andrews, president, and C. T. Adle.
Bethlehem Steel Corporation, E. G. Grace, president.
Bourne-Fuller Co., R. S. Hall, vice-president.
Brier Hill Steel Co., W. A. Thomas, president, and G. F. Alderdice, vice-president.
Central Iron & Steel Co., F. J. Hall, vice-president.
Central Steel Co., F. J. Griffiths, vice-president.
Chrome Steel Works, F. E. Canda, president.
Cleveland Steel Co., J. C. Jones, president.
Crucible Steel Co., Herbert Dupuy, chairman, and O. H. Wharton, president.
Donner Steel Co., W. H. Donner, president.
Eastern Steel Co. of America, V. Preston, president.
Glasgow Iron Co., C. B. Shoemaker, president.
Harrisburg Pipe & Pipe Bending Co., W. T. Hildrup, Jr., treasurer and general manager.
Jones & Laughlin Steel Co., B. F. Jones, Jr., president.
Kokomo Steel & Wire Co., J. E. Frederick, secretary.
LaBelle Iron Works, R. C. Kirk, president, and W. B. Higgins, assistant general manager.
Lackawanna Steel Co., E. A. S. Clarke, president.
Laclede Steel Co., T. R. Akin, president.
Lukens Steel Co., A. F. Huston, president.
McKinney Steel Co., Price McKinney, president.
Mark Mfg. Co., Anson Mark, vice-president.
Midvale Steel & Ordnance Co., A. C. Dinkey, president.
Moorhead Brothers & Co., Inc., T. D. Moorhead, vice-president.
Nagle Steel Co., L. F. Nagle, president, and A. P. Cairns, purchasing agent.
National Enameling & Stamping Co., R. D. Samuels, assistant secretary.
Otis Steel Co., H. E. Higgins, vice-president.
Penn Seaboard Steel Corporation, Rodney Thayer, president.
Phoenix Iron Co., David Reeves, president.
Pickands, Mather & Co., H. G. Dalton.
Pine Iron Works Co., J. B. Bailey, president.
Pittsburgh Steel Co., D. P. Bennett, vice-president, and J. G. Deericks, general manager of sales.
Republic Iron & Steel Co., J. A. Topping, chairman.
Sharon Steel Hoop Co., Severn P. Ker, president, and E. B. Kibbe, general manager.
N. & G. Taylor Co., William W. Justice, vice-president.
Trumbull Steel Co., A. N. Flora, vice-president.
United Alloy Steel Corporation, H. R. Jones, president, and E. A. Langenbach, chairman of the board.
United States Steel Corporation, E. H. Gary, chairman, and J. A. Farrell, president.
Whitaker, Glessner & Co., William H. Abbott, vice-president.
Wickwire Steel Co., W. A. Wickwire, secretary.
Witherow Steel Co., W. P. Witherow, president and general manager.
Worth Steel Co., W. P. Worth, president, and E. A. Worth.
Youngstown Sheet & Tube Co., J. A. Campbell, president.

Judge Gary's Opening Remarks

JUDGE GARY: Gentlemen, this is an important meeting. It is a patriotic meeting. The steelmakers are called together to consider very important matters, at a time and under conditions which are somewhat critical. We have come together to counsel with one another. It is unnecessary to emphasize the fact that the Allies engaged in the Battle of all Ages are calling upon this country for all the help that can be given. The Allies themselves are doing everything possible to provide the essentials for war purposes, but they are still lacking in the quantities necessary. And this country is therefore called upon to furnish more and more steel and more and more men and supplies of all kinds that are requisite under the conditions which obtain on the battle lines. They need more men, more food, more munitions of war, more guns, and various other things, and ships to carry them across the seas when needed. And all these things must be provided at the very earliest moment. The furnishing of necessary supplies promptly means the saving of millions of lives. So far as I am personally concerned, while I have great hopes for the future and a feeling of grim determination to win this war, yet I have a feeling of fear for catastrophes, a fear for results that we cannot recover from. And that arises not from the fact that we have not enough men or money or materials, but rather from the fact that there is danger that these will not be provided as promptly as they might be and as appears to be absolutely necessary if we are to do everything we ought to do and that we can do.

I feel it is not necessary in talking to Americans to deal in language of patriotism or duty. Many of your boys and your relatives and your friends are already on the battle lines or on their way to those places, and more and more will be called and are going. And the more diligent we are in the performance of our duty the less will be the number that are called upon to make the supreme sacrifice which war, and war alone, asks of the people, of the country.

Gentlemen, we are here to-day to consider whether or not we can do more in providing the requisites for winning the war. We have a general committee representing the iron and steel industry, which means you, and that has a subcommittee of distribution and other subcommittees; and all have been very diligent in attending meetings, in ascertaining facts and figures, in securing data as to capacity and as to shipments, and generally in regard to the details of the business of different lines of manufacture. We all recognize that one of the first essentials is steel, that it is almost as important as food; that the soldier can do nothing without steel, and that nothing can be taken to the soldiers except by the use of steel. And we have been endeavoring to ascertain what more, if anything, could be done, what negligence, if any, there has been with respect to the performance of duty up to the full measure by any of the manufacturers. We believe that more can be done.

Willing to Increase Capacity

When the committee ascertains that the total capacity of the country is being used for the benefit of the military, and that it is insufficient, then we are willing to increase capacity. But that requires a good deal of time. The building of a mill or a furnace occupies too much time, except as a last resort in the endeavor to furnish supplies. It is obvious that every furnace, every mill, every facility for production must be used for the purpose of carrying on the war. And in this connection that war's necessities must always be at the top and in front, that non-essentials must be dominated by military necessities, non-essentials of all kinds and in every particular must be subservient. If the mills need more pig iron, pig iron must not be utilized for non-essentials until the military necessities

are fully supplied. And the same is true of ore; and the same is true from the pig iron down to the finished product which the Government needs. The question of making money, while always important and necessary for the nation, is of no importance when compared to the immediate necessities of the Government for the production and delivery of the things which it demands and finds necessary for military purposes.

Therefore our whole business must be managed in such a way as to secure the best results for the Government, even though at times at the expense of production in some lines less essential and the making of money for the owners' property.

Crisis in History

We have reached perhaps a crisis in this war's history. We are called upon by the Government for more and more work and more and more material. And the Government has placed Mr. Replogle, as Director of Steel Supply, in the immediate and absolute control of this situation. Mr. Replogle has been requested, if not directed, by the War Industries Board and at the request of other high departments in Washington, to take any and every step he considers would be of advantage in securing what is so much needed at this time in the lines which we represent. We have not yet approached the position which is occupied by Great Britain and perhaps other nations. And one of the things which has been suggested, and which Mr. Replogle has delayed putting into effect at our request, is the question of enforcing a rule or an order for the application of a license to sell and ship our materials not included in those which are called preferential and which are on the preferential list, so as to make it necessary that a mill shall not be operated or the business of manufacture conducted in such a way as to ship the products less essential which directly or indirectly may be to the prejudice of those which are essential.

Now this step may become absolutely necessary. If it does, if so decided by the department, then we must gracefully submit, even though we might be of the opinion that as a total net result it might not be to the general interest of the country. As I take it, this does not mean that if in the manufacture of essentials there are certain discards which can be utilized for other purposes not essential and without interference with the full supply to the Government of what is necessary and what can be furnished, there would be any objection. But it does mean that in our operations we must do nothing which is calculated to reduce the supply of steel for military purposes for this country and for its allies who are engaged with us in the defense of their rights and in the defense of our rights, in the defense of civilization itself.

Purpose of Meeting

And so, gentlemen, we have called you together to-day, not for the purpose of attempting to lecture, not for the purpose of telling you what your duty is—because you know that—but rather for the purpose of expressing in a few words the situation as we see it, and with the expectation that to-day we shall hear from you representative men who are in control of these lines of manufacture so necessary, an expression of what you think in regard to the situation, which expression should amount to a pledge all of us must give, that we will devote our works, our time and our money, as requested by the United States Government, to aid in this time of extremity.

And now I am going to ask Mr. Replogle to speak to you on the subject with respect to the necessities of the Government, what it is getting, what it is not geting, what is lacking in any particular or at any point, and with respect to any suggestions for improvement in these conditions. I am going to ask Mr. Replogle to be very plain. I consider it is his duty to be explicit. Occupying the governmental position which he has been filling, and is filling so acceptably, I believe it to be his duty to be plain, to be matter of fact, to call names, to speak of plants, and to tell us one and all what more we can do. And at the beginning I pledge the United States Steel Corporation and all its subsidiaries and all its interests to do everything to the utmost to accede to his requests and to assist the Government at this time.

Mr. Replogle's Address

MR. REPLOGLE: Gentlemen, Judge Gary has stated the general conditions so wonderfully well that it is superfluous and would be more or less foolish for me to attempt to elaborate on them. It is my firm conviction, and it is a proven fact, contrary to the general impression, that there is a surplus of steel, that there is a very decided and acute shortage, which is delaying the war program. I do not say that in most lines there is not sufficient capacity, if that capacity was fully utilized. If they had 100 per cent fuel and 100 per cent labor conditions, and 100 per cent transportation conditions, I feel that in most lines of steel products the war necessities could be fully met. But that is not the condition. We do not have 100 per cent fuel, transportation or labor, and we are not going to have. Transportation conditions are not materially improving in a general way; some places they are and other places they are getting worse. And when we consider the situation as it is to-day, with the wonderful weather conditions and transportation conditions, we are shuddering when we contemplate the winter season before us. The building construction and plans of the United States Government, incidentally, are some 20 per cent right now in excess of the total building construction of the United States for the 3-year period, 1915, 1916 and 1917—the United States construction program alone, 20 per cent. And that program is not designed—I mean the 1918 program—but they are advancing into 1919 and 1920. There was just authorized yesterday the construction of the South Brooklyn warehouse, for instance, at an expenditure of $45,000,000, largely structural steel, but even that job requires 56,000 tons of steel. And that is only indicative of the plans that are in contemplation. We need hundreds of millions of dollars' worth of hospitals; they are commandeering summer hotels and eliminating some of that work in that way; but the United States construction program is enormous, I think far beyond the impression of almost any of you.

The Plate Situation

I have made a little statement here showing in a general way the present situation as regards the principal steel products. On plates, which are one of the most important, if not the most important, product we have, at the rate of production of the past 3 months there are now 32 weeks' rolling, about 8 months' rolling, on the books; and the business is being entered almost every week at a greater rate than it is being produced. Eight solid months. And with the exception of some Emergency Fleet material—and practically all that will be wanted before the expiration of that time—practically all of this is wanted immediately. An enormous percentage of it is needed now. It is not only needed for our own operations but for those of our allies. We have 52,000 tons to place this last week for the Italian Government, very urgently needed for ship construction. We ought to give the Italian Government 52,000 tons, and yet we do not know where to get it without seriously affecting our own ship building and necessary railroad construction.

Tonnage from England

We received yesterday 15,000 tons additional from the British, and that is coming in right along, and that will be 300,000 or 400,000 tons of plate. Some of the plates which we have for Great Britain are now 4 or 5 months over-due. They are furnishing General Pershing an enormous tonnage of materials, which at the last report approximated one million tons, which General Pershing has agreed to replace from this country, in the lines like plate, and some pig iron. We are getting

60,000 tons of iron which we have to send over there, and then other material. But there are 32 weeks, of which 26 weeks is direct United States and Allied Governments. I want to impress that on you, 26 weeks right now.

On projectile steel we have 36 weeks' rolling, all of which, of course, is for the United States and Allied Governments. And the forging manufacturers, according to the last report that Mr. Mackie has just received here,—we have gone into it very thoroughly with him in the last week, and Mr. Mackie is handling the projectile end for us very well—shows that they have just reached the point in their program where their consumption of projectile steel is going to be enormous. We will have to have at least 5,000,000 tons this year.

MR. TOPPING: Is that for all sources, Allied and our own Government?

MR. REPLOGLE: Yes, for all sources. We are rolling so much projectile steel on rail mills, and the rail situation is becoming so acute—the Director General of Railways says he will have to have 2,000,000 tons—and any increase in rail production will necessarily increase our trouble so far as projectile steel is concerned.

On rails at the rate we have been rolling in the last 3 months, we have 92 weeks' work ahead of us, 92 weeks, almost a year and three-quarters at the rate we have been going. On sheets we have less tonnage probably comparatively than on the others; but we have 24 weeks' output at the production of the past 3 months on sheets. And the United States Government—I have here some details which I will give some of you a little later in reference to the particular orders, some of which have been delayed for several months. And we have additional orders for sheets, some 30,000 tons there, that we don't know where to place right now without affecting the delivery of other important orders now on the books. On seamless tubes there are 27 weeks at the rate we have been running. And it is the general impression that owing to the curtailment of building construction, structural shapes will be comparatively easy. But the Emergency Fleet and new car construction, which involves 1,300,000 tons, and the fact that on many heavy shape mills we are now rolling projectile bars, means that we are having a good bit of difficulty in getting the required tonnage of structural shapes, notwithstanding the heavy curtailment of general building construction. On merchant bars we have 28 weeks.

Other Finished Products

By the way, on structural shapes the direct Government requirements alone to-day are 14 weeks. On tin plate there is 23 weeks, on pipes and tubes 28 weeks, wire and wire products 19 weeks, and on the all-steel product report as taken from your records we have 31 weeks' operation at the production of the past 3 months, which has averaged about 640,000 tons per week, a little over 30,000,000 tons annually.

The Canadian Government has ship yards, and very good ones. We had a particular case up a week ago where they had one 7000-ton boat, another 5500-ton boat, for which we were unable to give them steel, and unless they received the steel immediately they would be unable to get those boats out on the high seas before the closing of navigation on the St. Lawrence.

The Allied Council in Paris has asked for material for some Canadian Government cars to relieve the congestion at American ports, United States ports, and to utilize to the greatest extent the ports at Sidney, and Halifax, and thereby giving better ship movements, where there is about four days' difference, which is a big factor. We have to give them some steel.

English System Proposed

Now the immediate cause of this meeting was a direct and positive order which I have received from the War Industries Board and from Mr. Baruch personally, who has, under the authority of the President of the United States, Commander-in-Chief of the Army and Navy, delegated to him the powers as to priority of material and other things. And after consultation with the transportation people and the fuel people it was decided to go practically to the English system of an absolute prohibition on the consumption of any iron or the manufacture of any steel except for absolute war necessity. That has been done in England for several years, and I was just showing Judge Gary this morning that a concern over there was fined 156 pounds in the last current issue of the *Ironmonger* because it made 2 tons of steel without a license from the directors for the production.

Now the idea was that the manufacture of iron and steel should be limited to Class A and Class B priorities, except under special permit. And that applied also to discard steel. We appreciate, and particularly under present conditions when such a large percentage of your product is Government material, with the rigidity of inspection and specifications, that there is off-grade material, there are plates that do not meet this test or that, and which of course must go into other lines; they may be suitable for tanks or other purposes. And of course under those conditions, where you do not have a priority certificate, it would be necessary to apply to Washington for that permit. We appreciate that that is pretty drastic and involves great trouble to everyone concerned, and I was in hopes frankly that that could be avoided. I received a positive order to do that, and I have asked permission to withhold that until I learned the results of this meeting. Because unless we are given very definite information from you gentlemen here that the war necessities will have a greater order of preference and priority than has been given, why that order will be put into effect immediately. We are not satisfied—I had two hours before the Senate committee a couple of weeks ago, and I received a pretty drastic examination, and I stated then that the steel industry had met the situation, and without exception they were co-operating; but the more I get into it, gentlemen, it requires a considerable stretch of my imagination to be able to say that, because some of you have not played the game. As a general rule you have. But we run against the proposition that you are short of steel for this and that, and you are short of fuel and cannot operate, but somehow that shortage seems to fall on Government necessities. There are a great many of you—practically all I will say of the contractors who have British shells are far behind in delivery; some of them for three or four months. And we find that forge plants have been shut down and we could not get steel.

Doing Bit Not Enough

As General Haig says, their backs are against the wall, and the Kaiser is not going to wait, and we are not satisfied to wait on those shells if there is any way of getting those shells. If there is a shortage of fuel, if there is a shortage of ingots, it must fall on the less essential product, and the more essential and direct Government necessities must have such a degree of priority that that material must come. We do not like the expression "doing your bit;" we want you to do your all. It is past the point where doing our bit is satisfactory.

This is a crisis, and commercialism, gentlemen, must be absolutely sidetracked. There is just one thing that we have to do, win the war; and we must give them sufficient steel to do that. That is your job and my job. And I must speak frankly to you because those are my instructions. The Government will not tolerate any more the procedure of some steel companies. We have a force of men now checking up ingot production. We want to know where every ton of ingots goes, and where there may be a surplus of ingot capacity or pig iron capacity. Some of you gentlemen say we have a surplus of this or that and can put that in this commercial order. We are going to go into your plants and take that pig iron under Government commandeering order, or we are going to take that steel and give it to another steel manufacturer who is short, if that other steel manufacturer is working on Government material. That has been determined absolutely. There is too great a percentage of non-war material being produced.

The Garfield order of Jan. 17 has been severely criticised by all of us, I think, as being very drastic. And when we study the charts at Washington and see the

trend of steel production at that time, that many of the more important products fell off over 50 per cent, and see the improvement in the shipments of the same products immediately after that order, why we cannot help but believe that under the conditions it was the only thing to do. Several hundred ships tied up for lack of coal. We don't want you on steel, and we dare not reach the same position on steel that Dr. Garfield did on coal. And incidentally, in my opinion and the opinion of people far better qualified to judge of that than I am, the situation on fuel this winter is going to be far worse than it was the past winter. The fuel people feel that, and the railroad people, many of them, feel that.

JUDGE GARY: Will that be on account of railroad deficiencies?

MR. REPLOGLE: Yes, and the general railroad condition down in the East particularly, the rapid expansion of necessary industries and big warehouses, and things of that kind that are going to complicate the railroad situation.

The automobile manufacturers are going to be called to Washington within a week, probably Monday of next week. At that meeting there is going to be a definite determination as to what percentage of their capacity they will be permitted to operate. Indications are that there must be a decided and very drastic cut. At a conference which I attended yesterday, called by Mr. Baruch, he had Mr. Hurley and P. A. S. Franklin, and the War Trade Board and other representatives there, the shipping situation was found to be so acute that very drastic measures must be taken as to restricting imports of other than war materials. I feel personally that they have gone too far on their restrictions as to manganese. And incidentally, Mr. Farrell, Dr. Leith and Mr. Sanford would like to come up to-morrow to discuss that with you; and I told them that that would be satisfactory.

MR. FARRELL: I am glad to see that they are beginning to agree with the figures that we submitted six months ago.

MR. REPLOGLE: They do not agree with them. But it is the opinion of most people there that the War Trade Board is wrong. But we must reach a decision on that manganese question very promptly.

MR. FARRELL: The decision is, getting ships to transport the ore from Brazil.

MR. REPLOGLE: Dr. Leith is going to attempt to show you that it is unnecessary. However, you are better qualified to state. But my general impression is that the War Trade Board is wrong. It was very definitely determined there that, if the manganese situation was as bad as Mr. Farrell has indicated in his letter, it must be immediately corrected, and it will be corrected after this conference.

Great Tonnage Involved

There are things coming up, gentlemen—there is one matter involving an enormous tonnage of steel that is yet in a very confidential state, and I cannot touch on it; but I can tell you that the Government program in practically all lines of steel is so far in advance of the estimates which I have seen in the trade papers that if you were all in possession of that information you could readily see the acute necessities of the occasion.

And I am coming here to make a plea to you that commercialism—I do not say that you have not to-day reached that point, but if you have not reached the point where commercialism is absolutely sidetracked, I am making a plea that you do that. And I believe that if we have the assurance here of every one that they are going to devote all of their energies absolutely to war necessities until the steel situation improves to such an extent that other less essential demands can be taken care of, that we might avoid the necessity for doing something which, gentlemen, is going to make us take control of your industries away from you. The railroad people have in a measure lost theirs. And while I am not actively in the steel business to-day, I would very much regret to see action taken which I am positive will be taken unless every steel manufacturer just puts his nose right up against it and devotes absolutely all of his energies to the one thing of winning this war. (Applause.)

(At this point Mr. Replogle was called to the telephone, and on his return he stated: "Incidentally that was the Italian Mission, which is making a very urgent demand for these plates.")

Use of Bessemer Steel

MR. CAMPBELL: Mr. Replogle, I would like to ask if you are trying to use Bessemer steel wherever you can.

MR. REPLOGLE: On this new car program they wanted this 1,300,000 tons, and we told them they could go ahead with that program if they would use Bessemer—that it be left optional with the steel manufacturer whether Bessemer or open-hearth plates could be used, and they have agreed to that. They have also agreed that it will be optional with the plate manufacturer whether sheared or universal plates will be used. And they have also agreed to keep plate mills running 100 per cent in order to secure sufficient steel to carry out this car program. We are also now in the matter of rails, they have that under consideration, and they have agreed to make a pretty heavy tonnage of the rails now on order of Bessemer steel, although there is a decided prejudice against that by the railroad people, but they realize that under the conditions it is the thing to do, and they have so agreed; except on some of the larger trunk lines the main running track, on which they insist on open-hearth steel.

MR. DUPUY: Mr. Chairman, might I ask a question of Mr. Replogle?

JUDGE GARY: Yes.

MR. DUPUY: What has been done by the Government toward the commandeering of labor? Has anything been done about that? That is the basis of most of our troubles just now, I think, Mr. Replogle.

MR. REPLOGLE: Well, Mr. Dupuy, I am not going into the labor situation. I think all of you understand the situation, and it is a situation that is not the easiest thing to handle.

MR. DUPUY: The reason I mentioned it was because men have been at our gates within 24 hours and taking our men away. Should not the Government commandeer that labor and make those fellows work?

MR. REPLOGLE: That is a condition that is more or less true in normal times.

MR. DUPUY: That is one of the reasons you are not getting material all over the country.

MR. REPLOGLE: Labor will be supplied to the essential industries in such quantities as will permit the maximum operation.

MR. DUPUY: I am talking about skilled labor. We had a man at our gate yesterday from one of the concerns in Newark, hiring our men at 62 cents an hour when we pay them 33.

JUDGE GARY: Let me suggest, Mr. Dupuy; you are not responsible for those conditions, and if there is less production because of conditions which you cannot prevent you are not to be blamed.

MR. DUPUY: We are, and we have been right along, and we have been to-day; and that is one of the reasons I speak.

MR. REPLOGLE: You could not get the steel, though, for these shells.

MR. WHARTON: The steel has been made.

MR. REPLOGLE: It is a peculiar thing that this shortage falls on the acute necessity.

MR. WHARTON: We are making over 90 per cent going into war necessities, and you can verify that.

JUDGE GARY: What does the other 10 per cent go for?

MR. WHARTON: Miscellaneous item. We have the cleanest record—or as clean as any manufacturing steel concern in the country, and the fact is that in patriotic effort we do not expect to have anyone outdo us.

Pledges Proposed by Judge Gary

JUDGE GARY: I would like to start at this point and secure the pledges of all who are here. Perhaps you can formulate a pledge better than I, but I had thought, in fact Mr. Topping had urged, that we secure a written pledge. I think perhaps we can take these pledges to-day; we have a stenographer, and I brought him here

largely for that purpose; I think we can take them down in such a way as to make them just as binding on all of us.

MR. TOPPING: May I suggest, it occurred to me that we might take that pledge to our works and extend it down the line to the important people on whom we are depending to a large extent, to get their earnest endeavor back of it also.

JUDGE GARY: We will consider that later. I have just sketched this pledge. See what you think of it. If it can be made any stronger I would like to have you suggest the amendment, gentlemen. I know by the applause that you gave Mr. Replogle you endorse everything that he has said: (Reading.)

"For myself, my corporation or my firm, I pledge the prompt production and delivery of the largest possible quantity of material in our department that is or shall be required by the United States Government for the necessities of itself and its Allies, and agree that all other lines of our business shall be subordinated to this pledge, and all this in accordance with the request of the War Industries Board."

MR. TOPPING: I think that covers it well. I move the adoption of it.

MR. DUPUY: How are you going to determine that which shall be subordinated? We make tool steels for all plants; and how are we to know whether they are required in Government orders?

JUDGE GARY: You must inquire and use your conscience. And if you have any doubt about it, make inquiry. We all have the same thing.

MR. REPLOGLE: Mr. Dupuy, I want to say, about the case that you speak of on shell steel—if the shell steel for the British in the particular size that you are making there happens to be the one for which they are in the most urgent need at this minute, if in the last offensive that particular size went in such quantities that they are in great distress—now that is several months behind—if you had that steel, you say it is transportation, why did you not take it up with us and show us what was being delayed, because the railroad situation was never in such a shape that we could not in an acute case like that have gotten that material pushed forward.

MR. DUPUY: Our traffic manager wore his shoes out in Washington, trying to get transportation.

MR. REPLOGLE: We have those cases before us continually, dozens of them every day; and while in all cases they could not get relief, in case of an acute emergency of that kind I do not know of any case where we failed to get results after it was taken up with the railroad people in the proper way. That is what I criticise as a lack of effort. I do not want to point out the Crucible company particularly, because that is indicative of many, many others. This happened to be the last case that was before us.

JUDGE GARY: Let me read this again, gentlemen. (Reads pledge.) That is pretty strong, gentlemen.

Mr. Verity's Views

MR. VERITY: Mr. Replogle and Judge Gary, it might be more fitting for some of the larger manufacturers to speak to this resolution first. But to start the ball rolling, I want to say that I do not think there is any industry in the United States that has more hundred per cent Americanism than the steel business. I think you said that, and you know pretty well. I think it is only a question for the steel industries to understand the situation. What is it that the situation needs of us? We have been groping around in the dark, and it has not been easy for everybody to find himself. We started out with the idea in this war that the Government was only going to need about 15 per cent of the product of the steel companies. That is where we began. The situation is so enormous that it is hard for any set of men to grasp it. The needs have been great and we have been coming along pretty fast. Now we are placed in the situation to-day that Mr. Replogle tells us, that civilization needs practically the production of the steel business of this country. Now with the intelligence of the men in this business, with the understanding of this term as we have it to-day, it would be not only absurd, it would be asinine, for any manufacturer to do anything less than do what he had in his power to do to bring about what Mr. Replogle wants. In the interest of ourselves now and after the war, there is nothing to do but to get behind this with our whole force, not quibbling about details, get in and do what he can find for us to do. We are going to learn some of the lessons which you have been trying to teach this industry for a great many years, lessons of co-operation, which will make us better as a nation after the war, and we are going to learn these things of necessity. And in that we are going to get a great deal of good. Every man naturally wanted to take care of his good customers, he did not want them to feel that he was lying down on their needs. And we have not known just how far we ought to go. I am sure every man will back you up in your statement to do everything and anything that is in your power. And for my company I want to say that we will sign any resolution that you may write to back up our Government in this the greatest crisis in history.

JUDGE GARY: A fine speech, Mr. Verity. I am going to give an opportunity to discuss this question; and after full opportunity is given to discuss it, we will have the roll called and take the names and have them vote yes or no. I believe in giving everybody a chance to be heard. And as far as I am concerned I never pass judgment on anybody or anything or any company until I know the facts. And there is not going to be any lack of co-operation, no arbitrary method so far as any one connected with the steel industry is concerned. They are going to try always to get at the facts and to pass judgment and to make recommendations accordingly. Do not forget, Mr. Replogle is a Government official here under directions from the Government. He makes investigations from an impartial standpoint, no personal axes to grind, no one to punish, no one to reward; doing simply his duty as he understands it for the War Industries Board. And if any mistakes are made at any time by him or by the War Industries Board or by the Iron and Steel Institute, they will be glad to be informed and make corrections accordingly. Full justice is intended to be done. But neglect, intentional, preventable neglect, to the prejudice of the Government, cannot, must not and will not be permitted. And I think we will all agree to that. And I believe everyone present will pledge himself and his company or his firm accordingly.

Now you must have an opportunity to be heard, gentlemen. If you wish to discuss this, here is the chance.

Mr. Campbell and Others Speak

MR. CAMPBELL: It seems to me that it might be well to emphasize this. Many of us felt that the Government was not going to require over 15 or 20 or 30 per cent; we have been kept increasing it all the time. A number of us have been trying to take care of our customers as best we could with our Bessemer steel, but our demands have been so great that recently we do not permit our selling agents to sell anything without first asking us whether they can or not. And we are now trying to use all of the Bessemer steel that we can, largely going into line pipe and other things. It seems that we all have a good excuse to our regular customers to say to them that our war needs are such that we cannot give them materials. We perhaps have not had this excuse to give them up to date authoritatively, we have only given that excuse because the pressing needs have become greater all the time. But now that we have the fact that the Government is going to practically require all of the steel production, we have got to subordinate our whole manufacture, and we can very well say to our customers that we are supplied with Government orders and we are obliged to turn them down and give the Government our entire output. And up to this time it seems to me that we have not quite had that opportunity.

MR. TOPPING: There is just one thought that comes to my mind. It seems to me we ought to do something more. We are taking the pledge ourselves. The obligation is so obvious that it is not a debatable question. I do not think we ought to overlook the individual re-

sponsibility that the heads of these concerns are taking on. And I want to suggest to all of your that in taking this pledge you pass the pledge down the line to the rank and file.

JUDGE GARY: I think that should be a separate motion. I think that is not germane to this. I would be glad to entertain a motion of that kind later.

MR. TOPPING: All right.

JUDGE GARY: Are there others?

MR. CLARKE: In taking a pledge of this kind, which I am sure we all ought to do, I wonder if everybody clearly understands what are these Government needs and how these Government needs will be put to them, as to whether there will be anything left to judgment as to whether there is a Government need, or whether it will be left to some one to decide some of these questions himself on his general understanding of the situation.

JUDGE GARY: "And all in accordance with the request of the War Industries Board." I have covered that.

MR. CLARKE: What I want to make sure is this, that if people feel that the steel that they ship is going into the war work——

JUDGE GARY: The War Industries Board will formulate its program, and if any one is looking for information or knowledge he can make his inquiry and ascertain.

MR. REPLOGLE: The general instructions issued by the priorities committee giving the classification in the order of relative importance, which I think all of you have, in a general way I think shows that pretty plainly.

JUDGE GARY: That is a detail as to how we shall carry this pledge into effect.

MR. DALTON: I do not think we are ever going to win this war unless the individual gets right down into his mind and has the responsibility for himself. Mr. Topping suggested getting the pledge of the employees; that is all right. But listening to Mr. Dupuy, to be perfectly personal, I think it is his job to know, and not his traffic man's job to know, whether his material is not being shipped. In other words, I think it is on us to know whether this thing is being done or not. We cannot pass the buck to somebody else and ever win anything. (Applause.)

Not a Case for Argument

MR. GRACE: It seems manifestly to me so much our duty in a case like this that it is not one for argument at all. Our interests have been in this war game a great many years. Our one regret is to-day that we are not giving the Government all that they want from us. It is our extreme regret that we cannot give them more in certain particular lines which we manufacture. As I understand our machinery to-day, Mr. Chairman, it is just as if the American Iron and Steel Institute Organization, which has been put into effect, is subject to Mr. Replogle's instructions. We are working for him. As I say, if the organization which he has created through you in the American Iron and Steel Institute does not serve him in an efficient manner he will create a new organization.

JUDGE GARY: That is all good talk. Any more? This is a patriotic meeting, and we have got a lot of patriots here.

MR. HUSTON: I would like to ask Judge Gary when you start out with 100 per cent, just what is intended to do with the discards which cannot be applied to Government work.

JUDGE GARY: Unless the War Industries Board is satisfied that it is necessary to do something you will go on just as you are, using your judgment and your conscience; but the moment the War Industries Board or the committee is satisfied that you are going beyond that there will be inaugurated a license system which will prevent you from using that without a license.

MR. HUSTON: I think any concern that has a large amount of discards would soon be balled up and could not do anything. So in order to get the 100 per cent of Government work we will have to be able to use discards when properly applied.

JUDGE GARY: My principle and my policy when the public complains is to study the question to see if the criticism is not deserved, and, if it is, to correct what is being done. It depends upon the angle from which you look at these questions. We are all selfish, and we are all human; there is not much difference between us.

Now, gentlemen, are you ready to have a roll call? Mr. Clarke, will you call the roll, and we will take a vote, yes or no, on this resolution.

Vote Is Unanimous

Representatives of all companies in attendance, 45 voted in the affirmative.

MR. KER: That resolution is so broad, and covers so admirably what it was intended to express, I would like to ask here that a copy of that resolution be mailed to each of the companies here; and if there are any important companies not represented, that a copy of it be mailed to them with information as to the sentiment of this meeting.

MR. LUKENS: Why not have that printed, or very plainly written, in other languages than English, if necessary, and put it on the bulletin boards at our plants? Would not that pledge our employees sufficiently? I think I would do it any way at our plants.

JUDGE GARY: I think the motion of Mr. Topping now is in order, and it is that an opportunity be given to all steel makers who are not here, and to such other officials of corporations that are represented here, and also to employees, to sign this pledge, and that the same be printed and distributed for that purpose. This will put it in such a manner that our committee can control it and secure as many other pledges as possible.

The motion was seconded and unanimously carried.

Resolution of War Board

MR. REPLOGLE: I just want to read you a resolution of the War Industries Board which was approved by the Secretary of War and the Secretary of the Navy. It is probably a great mistake, but it is a resolution. It has a bearing on certain other matters:

Under and subject to the Raw Materials Division of the War Industries Board, J. Leonard Replogle is hereby appointed Director of Steel Supply, and shall have charge of the distribution and be responsible for the proper execution of all orders for iron and steel (including steel billets and bars for ordnance, but not finished ordnance or gun forgings) for the United States and Allied Governments.

He shall receive weekly reports from the iron and steel producers showing the tonnage of iron and steel of the various classifications on order for the United States and Allied Governments as well as domestic and foreign orders for general purposes. He will also keep informed as to mill capacities and mill production and, in cases of retarded output, secure reasons therefor and in conjunction with the manufacturers and War Industries Board make every proper effort to remove obstacles which prevent maximum output of war necessities.

Memorandum requisitions from the various Departments of the United States Government should be sent in triplicate to the Director of Steel Supply, who shall, after proper consideration of all mill conditions as to getting maximum production and with particular reference to priority status of the order books of the various manufacturers, determine as to the allocation of the orders and all necessary details and retain one copy in the office of the War Industries Board; send one copy to the Washington office of the American Iron and Steel Institute and return one copy with information as to where the order should be placed and necessary details to the department from which the order emanated. The department concerned will then place order direct with the manufacturer in accordance with their particular order system.

Requisitions from the Allied Governments, after approval by the Allied Purchasing Commission, will be sent to the Director of Steel Supply for proper distribution.

The Director of Steel Supply shall at all times work in close harmony with the various Departments of the Government, who shall give him as much preliminary information as possible in order that material can be placed to the best advantage of all concerned and with due consideration with respect to giving the mills the best operating conditions to

permit maximum output at minimum cost so far as the Government necessities will permit.

The Director of Steel Supply will have all necessary steel statistical records to which the authorized representatives of the various Government Departments will have access.

Work of Steel Men

Now when that was put up to me it was the original thought that we would create our own organization at Washington. And at my suggestion, I felt that it was a mistake, I felt that you gentlemen in the industry could regulate that and allocate that to much better advantage than we in Washington could; and that a committee of the industry in daily touch and contact with all the conditions would be in a better condition to properly handle that work than we could there, although the authority was put up to us. Now, the American Iron and Steel Institute, following those suggestions, appointed a committee, of which Mr. Farrell was chairman, and which has been represented in Washington, and in a very wonderfully capable way, by Mr. Bonner. I cannot emphasize that too strongly. I think Mr. Bonner has handled the situation, and the committee have—Mr. Bonner the details of it—down there in a perfectly wonderful way. We have had a great many of the manufacturers come to us, feeling that the responsibility was up to us, and making objections from time to time on minor matters. The authority probably was up to us as given under this resolution of the War Industries Board and the approval which it had by the Secretary of War and the Secretary of the Navy. But we have felt that we could not get the proper results by interfering with the work of this committee. And I want to make a plea that the heads of the various companies work in close touch and harmony at all times with this Steel Committee. You are representing us, we are on one side of the table, in a way, and you are on the other; but it might be better to say that we are all sitting at the same table and have the same object, and that we cannot get proper results by your people coming to us with kicks of this allocation and that, and some of you insist that only your proper proportion of each and every order be allocated to you, that the particular specification in some respects may not be as desirable as others. But in the general jack-pot—I have gone into it very thoroughly, and I know that Mr. Bonner and the committee down there are doing perfectly wonderful work, and it is fair to all the manufacturers. And I hope that you will give—I think most of you are—the heads of the companies are—but in some cases some of your subordinates make it pretty difficult for this committee; and I bespeak for this committee everything you can do. I would like to have Mr. Bonner say a few words.

JUDGE GARY: The American Iron and Steel Institute appointed the general committee, and the general committee appointed the sub-committee on distribution.

MR. REPLOGLE: That is right.

JUDGE GARY: And that sub-committee or distributing committee selected Mr. Bonner after consulting with various presidents of companies as they could reach them.

Complaints About Delays

MR. BONNER: One of the things that we have discovered here that I think requires attention of the executive is that Mr. Replogle has received complaints of delays in the delivery of fabricated work, particularly for ships, and asking us to take the thing up with the mills specifically and bring about a satisfactory adjustment. An investigation shows, as I diagnose it, that while the executives themselves of all the steel companies appreciate very thoroughly the situation, and when we appeal to them and bring matters to their personal attention we get almost instant and satisfactory response; but down along the line the men who have to do with the orders and the execution of them do not respond quickly and freely, and they do not follow the things up as carefully as they should, and that in turn involves the industry in criticism and makes delay in construction. I have been hopeful that the mills themselves would avoid a great deal of that, which I think they could do if each of the steel companies having orders for shipyards or for fabricators for ship materials itself would constitute itself a committee of one to see that the orders which it has from shipyards or from fabricators are executed to the satisfaction of the man from whom the order was received.

MR. REPLOGLE: In proper sequence.

MR. BONNER: Yes, in proper sequence. The big shipyards, the American International and the Submarine Boat, particularly, while they have in volume now, apparently, sufficient steel to meet all their estimates, they have not the items necessary to complete important parts of those ships, simply because some one along the line has not apparently given the attention to it to see that they were supplied. Without attempting to criticise—we only got this together two days ago—for example, the Allegheny Steel Co., there is a complaint that they are 45 tons behind on January and February orders, which they want. The Bethlehem Steel Co. complains of December and January and February orders. The Carnegie Steel Co. complains of February and January orders, and so on with a number of other companies. These orders are for comparatively small amounts of plates and ships and bars, but they are apparently necessary to complete the construction of these ships in sequence. And I would like to urge the executives to get their men to follow up to completion, without waiting for complaints to come from the Government or from some other source that items are needed. It would save an awful lot of trouble and delay.

JUDGE GARY: I suppose you have notified the heads of these companies of these delinquencies, have you not?

MR. BONNER: Not these particular ones.

Mr. Dalton's Point

JUDGE GARY: I think Mr. Dalton made this point very clear and very emphatic by saying it was the duty of the heads of all the concerns to personally see that the orders were executed, that the business be followed up, and that the duty of the concern in question was actually performed, that no official, however high he may be, in any concern has any right to wash his hands or attempt to wash his hands of responsibility; that we are each and all of us responsible for this work.

Gentlemen, it is our work. These needs are our needs. This is our Government. We are asking for this steel for ourselves, for the protection of ourselves and our boys and our friends and our business. We cannot agree to the proposition of Mr. Replogle, although it was only stating literally the situation, that the Government is on one side of the table and we are on the other. We have got just as much responsibility and just as much duty concerning this whole thing as any one, and we are not doing something because we are required to do it; it is our business and our duty, and we must not neglect anything, because we are protecting ourselves. But I think this already has been emphasized. I am very much pleased with some of the remarks made here to-day. I thought Mr. Verity's speech was very strong. He put the situation from the standpoint of duty and patriotism which rested upon each of us as individuals. I think the action of every one here to-day makes a record that we all of us ought to be proud of.

During the time I have been connected with the steel industry, during the period it has been my pleasure to be closely associated with steel men, from time to time I have been proud of their attitude, their fairness, the feeling of justice, the disposition to co-operate and help one another, to serve one another, and to serve the public, and to serve the country, and to serve every interest that depends upon their action. And to-day we see another exhibition of the bigness of the men who control the steel industry. There is not any room left for criticism.

Some one remarked that the steel men generally had been more patriotic and more prompt in their service than other lines of industry sometimes. To-day we are setting an example, we are establishing standards of propriety and right and justice and patriotism; and this influence spreads, others hear of it, and you may be certain—at least, I am certain, from the infor-

mation that I have received from time to time—that Mr. Replogle is not slow in presenting your interests; and not only that, your disposition, your efforts in favor of the Government, to whomsoever he meets who is interested in our affairs and business under his charge. That is bound to spread. And, gentlemen, we have done something to-day we may be proud of, provided we live up to our pledge.

And now, for all of you, for the keeping of your pledge, I give my personal pledge. (Applause.)

Order May Be Rescinded

MR. REPLOGLE: I just want to say that in view of the unanimous expression here of help and assistance, that despite the fact that I have a definite order to put out definite instructions, to put out the order to which I have referred, that I am going back to Washington with the feeling that that is entirely unnecessary, and I am going to try to have the order rescinded, because I believe, in view of what I have heard here, that it would work a hardship. We know that in many cases it would work a hardship, which we do not want to put on any manufacturer unless it is absolutely necessary. And I am rather convinced that I can induce the War Industries Board to rescind that motion; and that is going to be my attempt. (Applause.)

JUDGE GARY: It is a great thing to have a friend at court. Gentlemen, let us deserve that friendship.

MR. TOPPING: I was going to suggest, in order that we might put the right punch in the resolution adopted to-day—I would suggest that each and every one here take up promptly with their men and their organizations the pledge obligation, so as to stir up enthusiasm down the line, so as to get team work quickly. I will be at Youngstown on Tuesday, and will call a meeting of all our people, so as to not only get their pledge but to stir up the enthusiasm of the crowd. I think each man should take it up in his own way. I make that suggestion.

JUDGE GARY: A good suggestion.

MR. CAMPBELL: Mr. Replogle, I want to give you a little information; there are several departments in Washington which are still asking for prices on all of the materials that prices have been fixed on, and they are wasting a good deal of time in asking for prices and insisting that prices be quoted before they place their orders. They will ask all the different mills for a price on a certain order of pipe, and then they will quote perhaps for a year's delivery or six months' delivery, or something of that kind, and then they will finally come to me to distribute it; but they insist on a quotation from these different people, and they lose a good deal of time.

MR. REPLOGLE: Do not forget, though, Mr. Campbell, that prices were not fixed. Maximum prices were established, and there is nothing to prevent you from quoting half that price. And incidentally, some of you have almost done that very thing.

JUDGE GARY: Mr. Dinkey, representing big guns, I think you ought to say just a word here. What is the word?

MR. DINKEY: When you asked for remarks it was going through my mind that I was a voting member and not a speaking member. For our company I do not want to claim that we are more of an American company, or that we are more patriotic than any other company. I feel that we are doing our work in a very responsible way. We all know the need for careful attention to details if we are to get the full measure and the full benefit of the work we do. I am glad Mr. Bonner brought that out. It is the completion of orders that counts, not the tonnage. (Applause.)

JUDGE GARY: Mr. Donner, will you say something?

MR. DONNER: I have not anything to say. We will give as near 100 per cent as we can. We have only a small plate mill. We can give 100 per cent if they can give us the material. We have absolutely no orders except at the Government price, except Japanese plates.

MR. REPLOGLE: I might state, in regard to Japanese plates there will be some of that material released in a week or so of the material rolled. We do not want any rolling until a little later, probably a month or so.

JUDGE GARY: This pledge will be printed and sent out by the American Iron and Steel Institute generally.

MR. CAMPBELL: Will it be sent to all manufacturers of all lines which they represent?

JUDGE GARY: Mr. McKinney, will you speak?

MR. MCKINNEY: They can have anything they want and any way they want it, and that is without reservation.

JUDGE GARY: That is good.

Mr. McKinney's Prompt Response

MR. REPLOGLE: I want to say this for Mr. McKinney. The first day I was on my job Mr. McKinney came in and said, "What can I do for you?" I said, "We have a big tonnage of billets for the Italian Government." He said he would take some. I said, "What is your idea of price?" He said, "Any price the Government puts on there, we take the order." I named a price at that time that was about $40 a ton under the price which he had sold billets on the previous day, but that was still in excess of the Government price which was established a little later, and Mr. McKinney got the billets at that price, and he has consistently—everything that has been put up to him he has said, "You never need to ask us; it is yours." That is the way Mr. McKinney has done. And that is true of practically all. In the early stages of the game, when we were in great distress for some material for General Pershing, we came to Judge Gary and Mr. Farrell, and despite the fact that they were loaded up they turned in—they had taken 70 per cent of all the Government orders placed at that time, which was far in excess of their capacity, and yet they absolutely took that without question and gave General Pershing the material when and as he needed it. Now, that is true of lots of others of you, practically all of you; and that is the spirit we want; and I am quite sure we are going to get it after this talk to-day.

JUDGE GARY: I think I would go one step further and say that whenever I have had an opportunity to meet steel makers who apparently were somewhat behind, and discussed the situation with them, without exception they have shown a willingness and a desire to come right up to the demands of the Government. But there has sometimes been a lack of information and a lack of understanding of conditions, and apparently there have been delinquencies, but I have not seen any man who was not 100 per cent patriotic; and, as Mr. Replogle has just remarked, when the situation is understood, and men get together, when they apply the principles and the pledges which have been discussed to their business, we shall have no trouble, I am sure.

Mr. Farrell's Suggestion

Mr. Farrell makes a very good suggestion, I think. When you gentlemen go home, if you will immediately get into contact with your subordinates who are responsible for the filling of orders, whatever lines, or for the work which is involved, so as to understand from them the situation as they see it at the mills, and in their offices, and they understand from you the necessities of the situation, we will find a practical application and a practical solution of these questions which we have been discussing; and I am very sure, I have known Mr. Dupuy many years, I know him better than Mr. Wharton, and I want to say that when he knows the situation thoroughly, when he knows what he is asked to do, and it is ascertained what he can do, there will be no reason for complaint of him. He is just as big a patriot as any other man in the room. We are not dealing with men concerning whom there is any doubt. It has been a great thing to come together here to-day, gentlemen, a great thing to hear Mr. Replogle and Mr. Bonner, and to ascertain the situation, and to have emphasized the requirements of the Government and the Allies, and to stop for a moment to consider what the possibilities are of a failure. It is a great thing for all of us to be able to do more and more in favor of the Government.

RAILROAD EQUIPMENT AWARDS

Flying Squadron of Locomotives to Relieve Freight Congestions—The Car Orders

WASHINGTON, May 7.—The Railroad Administration during the past week has let contracts for 1,025 locomotives and 70,000 freight cars in addition to 30,000 cars previously ordered. The total cost of this new rolling stock will approximate $350,000,000 but detailed figures cannot be given for the reason that the designs of many of the cars and some of the locomotives are subject to modification. In all cases, however, the Railroad Administration will hold the contractors down to a profit of about 5 per cent which is a reduction of 50 to 65 per cent in the margins contemplated in the original bids.

The order for 1,025 locomotives was divided between the American Locomotive Co., and the Baldwin Locomotive Works. Deliveries are to begin in July and continue monthly during the remainder of the year. The locomotives are of six standard types—one heavy and one light of each type—covering both freight and passenger service, and vary in weight from 290,000 lbs. to 540,000 lbs. The order involves an expenditure of approximately $60,000,000. The engines will be allotted, upon completion, to the various railroad systems where they are most needed. The awarding of this contract marks the establishment by the Government of the standard type of locomotives, specifications for which have been developed and perfected by committees of experts, who for many weeks have devoted much time and study to the subject.

The six standard types of locomotives, two sizes of each class, are expected eventually to supersede the many miscellaneous types and varieties of locomotives now in service, embracing engines building according to 500 or more varying specifications. This is the first time that any real forward step has been taken looking to the wide standardization of locomotive engines.

Special Types of Locomotives Yet to Be Placed

While it is regarded as practicable to standardize a considerable proportion of the locomotives used on the principal railroad systems, it is not believed to be wise to attempt to confine all railroads to a choice of the six types selected by the Government's experts. In many cases the conditions are such that the standard engines cannot be used and the Railroad Administration in recognition of this fact has already taken steps looking to supplying special locomotives wherever absolutely needed. Further orders for engines will be placed later in the season including these special types and aggregating 500 or 600 locomotives. The standard engines just ordered will be used as a so-called "flying squadron" and to a great extent will be under direct control from Washington with a view to concentrating them wherever necessary to relieve freight congestion or to move war material, shipyard supplies, etc.

The Car Awards

The 70,000 additional steel underframe freight cars, for which orders were given on May 3 include 15,000 40-ton double-sheathed box cars, 16,000 50-ton single-sheathed box cars, 15,000 50-ton composite gondola coal cars, 5,000 70-ton low-side gondola cars, and 19,000 55-ton hopper coal cars. The cars have been apportioned among the builders, which are enumerated as follows in the *Official Bulletin*: Bettendorf Co., Bettendorf, Iowa, 3,000; Cambria Steel Co., Johnstown, Pa., 3,000; Haskell & Barker Works, Michigan City, Ind., 8,000; Keith Car Mfg. Co., Sagamore, Mass., 1,000; Laconia Car Co., Laconia, N. H., 1,000; Lenoir Car Works, Lenoir, Tenn., 2,000; Liberty Car & Equipment Co., Chicago, 1,000; Magor Car Corporation, Passaic, N. J., 1,000; Mount Vernon Car Mfg. Co., Mount Vernon, Ill., 4,000; Pacific Car & Foundry Co., Seattle, Wash., 2,000; Pressed Steel Car Co., Pittsburgh, 14,000; Pullman Co., Chicago, 8,000; Ralston Steel Car Co., Columbus, Ohio, 4,000; St. Louis Car Co., St. Louis, 1,000; Standard Steel Car Co., Pittsburgh, 15,000. Also pending, to Barney & Smith Car Co., Dayton, Ohio, 2,000.

"These 70,000 freight cars, together with the 30,000 freight cars awarded a few days ago, will involve an aggregate cost of between $250,000,000 and $300,000,000. The orders were all placed upon the basis of the minimum bids as to costs for labor and overhead charges with the understanding that any reduction in costs which may be obtained from these fixed prices will be divided equally between the Railroad Administration and the car builders, but any increase in these costs will be borne exclusively by the builders. The Government will have supervision or control as to prices of the materials required in construction. The compensation of the builders will be approximately 5 per cent on the cost, as estimated on the minimum bid.

"The five types of cars represent the standard forms of freight cars adopted by the Railroad Administration. These standards are the result of the labors of a committee of experts who for weeks past have been working upon the problem. The adoption of these standard types, it is believed, will eventually substitute a few scientifically worked-out designs for the numerous miscellaneous varieties of cars, representing probably more than a thousand different old styles and specifications now in use, the accumulations of the past."

Effort to Save Rolled Steel

It is understood that there may be some modifications in the number of types of cars apportioned respectively among the car builders before the final detailed contracts are executed. The designers of the Railroad Administration are still at work upon the problem of reducing the amount of steel to be employed and hope is expressed that 200,000 tons of plates can be taken out of the total order which, as originally planned, called for 575,000 tons of plates. Efforts are also being made to reduce somewhat the 675,000 tons of other forms of steel estimated for the car program but it is improbable that any substantial saving can be effected as this estimate covers axles, wheels, shapes, bolts, etc., which can hardly be safely lightened. The War Industries Board has promised the Railroad Administration to provide all the necessary steel on the basis of a total not to exceed 1,100,000 tons, and no difficulty is anticipated in meeting this requirement, especially in view of the steps recently taken to limit the output of the iron and steel industry to war needs and so-called essentials.

The Wellston Iron Furnace Co., Jackson, Ohio, is making improvements at its plant, Wellston, Ohio, that are expected to be completed by Aug. 1. The company's production of Bessemer iron will be increased to 300 tons per day. The improvements include two new stoves 20 x 80 ft. with 7¾ in. checkers. The No. 2 stack is being enlarged and a new blowing engine and pumping outfit and one new battery of boilers installed. The production of this stack will be increased to 75 tons per day. Arthur G. McKee & Co., Cleveland, have the contract for most of this repair work. S. E. Stephenson is vice-president and general manager of the Wellston Iron Furnace Co.

Production of high-grade abrasive materials in the United States is the subject of a compilation by Frank J. Katz, United States Geological Survey, Department of the Interior, whose report on the production of emery, corundum and artificial abrasives in 1917 indicates a total of 72,276 net tons, value at $8,325,312, which is an increase of 33 per cent in quantity and 172 per cent in value as compared with 1916.

The Revolvator Co. has been formed, with offices at 387 Garfield Avenue, Jersey City, N. J., to act as the sole selling agent for the New York Revolving Portable Elevator Co. The latter company builds a line of portable and revolving elevators, tiering and ease-lifting machines, etc.

SHELLS FROM CAST STEEL

An Improved Iron Mold for Casting Blanks Used in Canada

THE manufacture of shells from cast-steel blanks, poured in cast-iron molds, was discussed in THE IRON AGE of Jan. 4, 1917, in an article entitled "Shell Manufacture from Cast Steel." The unusually successful efforts of the American Steel Foundries at its Sharon, Pa., plant in making thousands of these shell blanks weekly were fully described. Since that time the practice has broadened and several American and Canadian companies are doing similar work.

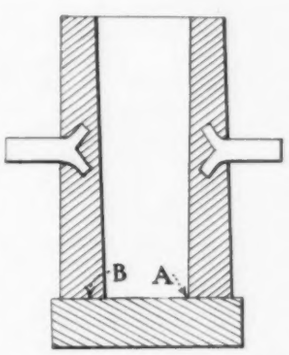


Fig. 1—Original Type of Mold Used for 6-In. Blanks

The experience of a Canadian company and some of the improvements it has introduced were recently dealt with in an article, "A Recent Improvement in Cast Iron Molds," in *Iron and Steel of Canada*. The main portions are as follows:

During the strenuous work of the last three years, with its enormous demand for cast steel blanks suitable for making high explosive shells, constant efforts have been made to reduce costs and losses and to improve the quality of the ingots produced. In the early days of this work it was customary for the Imperial Munitions Board to let contracts for so many blanks, but only to supply an approximate weight and size for each blank. To illustrate this point, when 8-in. blanks were called for the dimensions given were: 17¼ in. long and 8⅝ in. in diameter.

This blank had to be forged with a rounded nose, but in trying to do so physical defects developed, which were not due to inferior steel but to the mechanical effect of the work necessary for forging. The die pot used would allow the blank to enter for about two-thirds of its length when its descent was arrested by the contraction of the pot, where the rounding for the nose commenced. While in this position the piercing plunger, in passing down the center, exerted a telescopic action due to the fact that the outside edge of the bottom of the blank was securely held while the central portion was free and being forced downwards by the plunger under a pressure of approximately 500 tons. This unfair treatment of steel, at between 2150 and 2250 deg. Fahr., caused internal tears which the inspectors attributed to defective metal. They were in reality caused by stresses severe and abnormal due entirely to the shape of ingot being used.

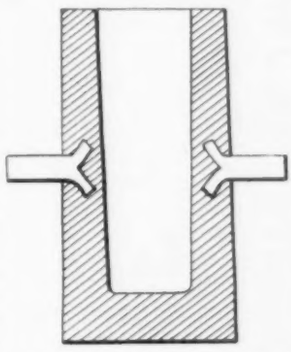


Fig. 2—The First Design of a Solid Bottom Mold

Realizing that it would be impossible to make satisfactory forgings from such blanks the Canadian Steel Foundries asked permission to design and try out a new type of blank. This experiment necessitated the use of a solid bottom mold, designed roughly and conforming to the outline of a finished forging.

This was the introduction, as far as Canada was concerned, of a mold with a closed end. The ingot produced was in every way satisfactory, but the descent to a cast-iron bottom of an intensely hot stream of fluid steel was found to be very severe. After a varying number of heats the bottoms developed cracks and these in turn were the cause of two troubles. First, the fluid steel entered these cracks and frequently caused "stickers" that remained fast to the mold, and where this was not the case the ingot was so rough and irregular on the base that expensive grinding became a necessity. The solid bottom, notwithstanding these conditions, was so successful in giving a sound pipeless ingot that it was adopted and proved commercially satisfactory, because the extra cost of molds was more than compensated for by the marked reduction in rejected blanks; 40,000 blanks were cast as a first experiment for a foundry loss of 1.86 per cent.

After applying this same type of mold for 9.2-in. work, the Munitions Board gave orders for 6-in. blanks to be produced and the design was again a parallel one. This size gave more trouble than any of the others and the losses due to pipe, indications of pipe or segregated areas were abnormally high. The proportions of this blank were wrong and it was difficult, if not impossible, to produce a perfectly sound ingot. In almost every case a split blank would show evidence of a very loose central structure or secondary pipe. Again the Canadian Steel Foundries asked permission to re-design the blank and the type finally adopted has been eminently successful; in fact three of the company's plants have produced upwards of 800 heats with a foundry loss of under 1 per cent.

The trouble with mold bottoms still continued, however, and it remained for J. I. Reid (an American and formerly works manager of the Thurlow, Pa., plant of the American Steel Foundries) to solve the problem and materially reduce the mold cost per ton of steel produced. With solid bottom molds one frequently finds the bottom burned and cracked so as to be quite useless while the inside walls are perfectly clean and uncut. It would be safe to assume that the average mold would have a tenfold life if the bottoms stood up as well as the walls, and Mr. Reid's idea makes this possible. Fig. 1 shows the mold originally used when demonstration had proved that a taper-blank was the most satisfactory and yielded the soundest ingot. This mold stood upon a cast-iron or steel stool-plate, but the trouble incidental to its use was that it was practically impossible to keep a tight joint between the mold and stool-plate as at B in Fig. 1. A breaking away of the inside edge of the mold after slight service permitted metal to enter between the two faces. This immediately froze causing a horizontal fin or lock. The same thing occured at the top between the mold and bush, with the consequent result that the extreme ends of each blank were sometimes immovably fixed while the center was still in a fluid condition. Then, as cooling or freezing progressed, contraction was retarded and a circular crack would develop 2 or 3 in. below the top of the ingot.

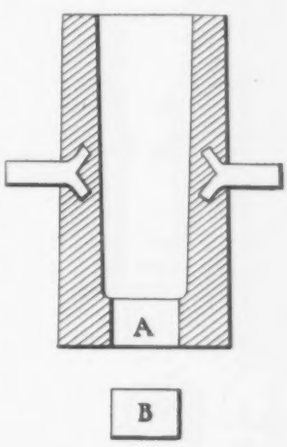


Fig. 3 — Improved Design Having a Removable Plug or Bottom

This trouble led directly to the introduction of the solid bottom mold as shown by Fig. 2. This design completely avoided any possibility of a bottom fin but left the burning of bottoms still to be overcome. Fig. 3 shows how, by Mr. Reid's design, the full life of side walls can be utilized regardless of the condition of the base. The original mold, instead of being cast solid, has a circular hole, A, cored through the base 5 in. in diameter. When the mold is mounted on a lathe for facing off, this is bored out, and a plug, B, Fig. 3, is driven in to form a solid base. By this means any number of bases can be used with one mold thus obtaining the advantages of a solid bottom design, and also the maximum service from side walls. The decided economy of this mold at once becomes apparent when one considers that a new one costs around $27, while a fresh base can be cast, turned and placed in position for approximately $1.50.

Economic Factors in the Iron Industry*

Improvements in the Hundred Years Before the Civil War — Then the Great Railroad Expansion—Anthracite Displacing Charcoal

BY DR. MALCOM KEIR

TO MEET requirements of markets in the west and along the Atlantic Coast, technical improvements in iron-making apparatus were required. The old forges in which ore was piled upon an open charcoal-filled hearth fanned by a gentle cold current of air squeezed from a hand-operated Cather bellows was inadequate, and hence was gradually changed to a better device. In 1750 water-power was applied to strengthen the force of the draft, and wooden bellows took the place of Cather. The better draft permitted a higher furnace and this turned out more product. The Lynn furnace of 1645, one of the best of its time, either in America or England, had an output of 8 tons a week. In 1788 the progress with draft and taller stacks permitted a product of 15½ tons a week.

The next step was taken in England in 1784, when Cort invented the puddling furnace and the grooved roll. Previous to this time all iron was purified by hammering with sledges over and over again. Cort's puddling furnace took pig iron upon a shallow saucerlike hearth where the iron melted. It was then stirred until nearly all impurities were removed. When ready, the iron was carried to the second invention—the grooved rolls—and there was twisted, turned and squeezed until it was pure enough to use. The resultant iron was fibrous and tough and therefore fitted for all purposes where strength was a desirable quality. All other needs were met by melting pig iron and pouring it into molds.

The final measure taken before 1830 to insure a supply of iron was a Scotch invention whereby the draft was heated before its entrance to the furnace, thus saving fuel and at the same time raising the temperature of the furnace. The Americans seized the new idea and brought their product up to 35 tons a week.

The Great Influence of Early Railroads

By 1830 the iron industry had attained this stage of mechanical perfection adjusted to the needs of consumers. Its story has been a tale of local markets supplied by comparatively small furnaces. While it is true that the industrial expansion of the east was reflected in the progress of iron manufacture, nevertheless by comparison with later events, the earlier iron trade was a small affair. The one factor of all others that has placed the iron industry of America before all competitors in the world is the railroad. Railroads have been the greatest consumers of iron within the history of that commodity. To build and equip the railways of United States has taxed the iron industry to the utmost; it has enforced changes in location, the adoption of new fuels and ores and an almost unbelievable advance in technique. Yet the full effect of the changes wrought by railroads was not felt until the Civil War, consequently there are two periods in the adjustment of the iron industry to the new factor, one from 1830 to 1860, the other, the subsequent years.

Railroads did not immediately influence the iron industry because iron formed so small a part of a railroad's equipment. The frames of locomotives were of wood, the coaches and even some rails of the same material. Iron entered into railroad construction and rolling stock only as wheels, axles, springs and parts of the engine. All the producing centers—Massachusetts, Connecticut, New York and Pennsylvania—contributed a share of these necessities. Gradually iron replaced wood in the frames of locomotives, and iron straps fastened to wood or stone constituted the rails. Parts of the New York Central retained these rails until 1850, and in the south they were familiar even ten years later. Loose straps were a frequent cause of accident, for they rammed through the floors of the fragile wooden cars maiming or killing passengers and often ditching the train.

No Bidders at First for Rails

Solid iron rails were adopted to remedy the evil, but none were manufactured in this country until 1844. It may be seen how little prepared our manufacturers were to recognize the possibilities for them in railroads when it is stated that the Philadelphia & Reading Railroad in 1844 advertised for months for 8300 tons of T rails without getting a single American iron master to bid, and was forced to import the rails from England. This was two years after the importation of rails, duty-free, had been remedied by a tariff. However, in the same year, 1844, a mill was erected in Maryland for the express purpose of rolling heavy iron rails, and was followed the next year by another new mill at Danville, Pa. These two mills may be said to inaugurate the modern expansion of the iron industry in response to the railroad influence.

In 1830 there were 23 miles of railroad in the United States. During the next ten years 2810 miles were laid down. All of this activity was confined to the Atlantic coast, with Philadelphia as the principal radial center. Between 1840 and 1850 no less than six thousand miles of trackage was built, for the most part in New England. These facts had an important bearing on the iron industry for they stimulated the American makers to feverish activity. Despite larger furnaces and improved processes, production lagged far behind demand, and the first railroads were largely equipped by foreigners. In 1850, 60 per cent of America's iron consumption was imported. Not only the railways themselves but all the manufacturing enterprises that the new transportation agent encouraged put a greater and greater strain upon our iron industry. In its headlong effort to keep abreast of its market, furnaces were enlarged, new fuels tried out, and a new region was chosen as a center where both raw materials and markets were within easy reach.

Causes Leading to Using Anthracite Coal

As long as furnaces were small, charcoal was the most desirable fuel because it made the purest iron,[17] but a large furnace required so much fuel

*Fourth part of a brief historical analysis to show how markets rather than raw materials have established the successive iron and steel centers in the United States. The author is assistant professor of industry at the University of Pennsylvania, Philadelphia.

[17]Two hundred and fifty to 360 bushels of charcoal to a ton of iron.

that the surrounding wood was soon exhausted.[18] A moderate-sized furnace necessitated a wood reserve of four square miles. To carry charcoal from a distance added prohibitively to the cost of production. The little 15 and 20-ft. furnaces of 1830 were utterly inadequate to produce the iron needed by railroads and factories, so the height went to 25, 30 and 45 ft., with a diameter of 12 ft. With increasing height, the scramble for fuel became ever more vigorous until the need for a substitute for charcoal was imperative. Soft coal generally was not strong enough to bear the burden of the ore[19]; distilled soft coal in the form of coke was then unknown in the United States, so there remained but one other available substitute for charcoal, namely, anthracite, which had been used in a minor way in connection with iron rolling since 1812. After much disappointing experiment, it was at last successfully used in smelting iron. In 1840, before the rolling of iron rails began, there were only six anthracite furnaces in all United States. In 1856 there were 121, and for twenty years (1855-1875) anthracite was the principal iron-smelting fuel.

As everyone knows, the anthracite fields are in eastern Pennsylvania about equidistant from Philadelphia and New York, and in a region where iron ore was plentiful. Connected to the seaboard by canals[20] and railroads, the area was admirably situated to support an iron industry, both because it had the requisite raw materials and access to the greatest market. In the ten years following 1850, the New York Central extended its lines to Buffalo by way of Albany, the Erie Railroad connected New York City with Lake Erie at Dunkirk, the Baltimore & Ohio reached the Ohio River and the Pennsylvania joined Pittsburgh to Philadelphia. Here was a circle of railroad building around the anthracite coal fields that helped to push railroad mileage from 9020 miles in 1850 to 30,626 miles in 1860. It is easy to see, therefore, why the Schuylkill Valley, the Lehigh Valley, the Susquehanna and the Juniata were the seats of the iron industry of that period.[21]

The real development of railroads, however, did not begin until after 1860. Since the railroads consume one-third to one-half of all the iron output, the great growth of iron manufacture also did not come until after the Civil War. Since that time, American railroads and American iron and steel have multiplied themselves so prodigiously that even the bald figures measuring the growth are well-nigh incredible. By 1890 we had 163,597 miles of track. This included no less than three transcontinental lines. The mileage laid down between 1880 and 1890—70,000—equalled the total building in the three leading European countries in fifty years. In 1914 more than one-third of the entire railroad mileage of the world was in the United States. This astounding record is reflected in the tonnage output of our iron furnaces. In 1860 the average run of a furnace was 35 tons of pig iron per day. By 1900 the American furnaces were pouring out 1000 tons[22] as each day's work—a thirtyfold increase in forty years. Nowhere else and in no other industry have these records been equalled. Consequently it is no surprise that the progress has been accompanied by marked changes in the location of the iron industry, the materials with which it works, the products which it sells and the organization by which such great results have been accomplished.

(To be continued)

[18] If all the iron of 1850, for example, had been produced by charcoal, it would have consumed 46,000 acres of forest. On the other hand, 200 acres of 4-ft. coal could do the same work.

[19] A furnace in Ohio, 55 ft. high and 16 ft. in diameter, produced 1600 tons of iron a month with raw bituminous fuel.

[20] Lehigh Navigation Canal, 1820; Mauch Chunk Railroad 1827; Union Canal, 1824; Schuylkill Canal, 1826; Reading Railroad, 1838.

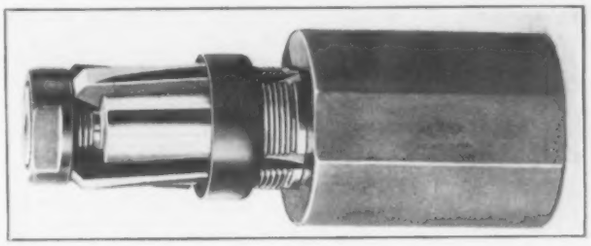
[21] Towns famous then and now for iron manufacture are: Reading, Harrisburg, Phoenixville, Steelton, South Bethlehem, Danville, Pottstown and Lebanon.

[22] The Bethlehem Steel Company in 1917 pushed this figure to 47,000 tons a month.

Floating Type Reamer for Fuse Holes

A number of special tools have been developed by the Wetmore Mechanical Laboratory Co., Milwaukee, for use in the production of munitions. These include taps, reamers, hobs and gages, and in designing them the experience gained since the first munition contracts were placed in this country has been drawn upon.

The reamer illustrated is designed for completing the fuse holes of 155-mm. army shells and is of the floating type. The blades, which are set on a left-hand angle with a view to insuring smooth cutting and reducing the likelihood of chatter, expand to take up the wear of the blades, the amount being governed by two ground nuts. The reamer is made to fit a 3-in. turret



Reaming of Fuse Holes to the Finished Size Is Accomplished by a Special Expanding Reamer of the Floating Type

hole and floats freely in its socket. If necessary the blades may be removed and replaced without taking the tool apart, and if it is desired to grind the blades in place this can also be readily done, as a true center is provided in the end of the reamer.

High Sulphur Iron for Rolls

Though sulphur is ordinarily considered a harmful element in iron and steel, it is claimed by Oliver B. McMillan of Pittsburgh, in a patent (U. S. 1,252,596—Jan. 8, 1918) that when proportionately combined with several other elements its presence in higher proportions than usual is not only not harmful but that it adds appreciably to the beneficial results of the entire mixture. The alloy which has given good results is as follows:

	Per Cent		Per Cent
Silicon	0.50	Manganese	0.30
Sulphur	0.12	Chromium	1.00
Phosphorus	0.08	Total carbon	2.40

This metal is particularly adapted for the making of plate mill, sheet mill, tin plate and other rollsd requiring hard, dense surfaces of considerable depth and resistant to abrasion and wear. The high sulphur increases the depth of chill, especially in the presence of the chromium.

The War Department, Washington, will erect two nitrate plants in Ohio, one at Toledo to be known as plant 3A, and another at Elizabethtown near Cincinnati, where 1200 acres have been purchased, to be known as plant 3B. The two units will have a total annual capacity of 110,000 tons of ammonium nitrate, equal to that now under construction at Sheffield, Ala. The units at Toledo and Elizabethtown will represent an expenditure of approximately $20,000,000.

The offices of the Chicago Flexible Shaft Co. are now located at 5600 West Twelfth Street, Chicago.

MACHINISTS ARE SCARCE

Manufacturers of Non-Essentials Asked to Release Men—Demand for Farm Work

WASHINGTON, May 7.—Lack of machinists and tool makers is retarding war production to such an extent that current output is only 75 per cent of what it would be were the labor supply adequate and manufacturers of non-essentials will speedily be called upon to release as many mechanics as possible for war industries, according to a statement by I. W. Litchfield, chief of the clearance section of the Federal Employment Service.

Many large war industries have notified the Employment Service that they will shortly need from 50 to 1,500 machinists and the service could place 10,000 of them tomorrow, were they available. The most serious shortages are in the East, where war material manufacturing is centralized.

Through the Public Service Reserve, the Skilled Labor Recruiting Division of the United States Employment Service, more machinists will be asked to accept war jobs. Government contractors are being advised to make appeals through local business organizations for machinists and in some cases the Employment Service is offering to supply one machinist for every one obtained locally.

It is the hope of the officials of the Department of Labor that the measures now being taken will prove adequate to provide the war industries with sufficient skilled labor, but, if necessary, more drastic methods will be invoked.

The Department of Labor, through the United States Employment Service, is appealing to manufacturers throughout the country to release as many of their workmen as possible from time to time as "part-time war emergency farm workers." This movement has been set on foot in Connecticut where a large number of manufacturers and merchants have officially indorsed the plan and agreed to release their employees. The release system as perfected in Connecticut is said to be much more effective than that employed last year to a limited extent by the Canadian manufacturers.

With the official approval of the Connecticut Manufacturers' Association and the Connecticut State Chamber of Commerce, the United States Employment Service, through Leo A. Korper, its director for Connecticut and Federal-State director of the Public Service Reserve, is obtaining pledges from employers to release men during the press of the harvest season as they are needed. Individual manufacturers are being brought into the project through the commercial organizations in the cities and larger towns and the local agents of the State Council of Defense in the smaller communities.

Already 13 of the largest industrial plants in Hartford have pledged the release of workers. Among them are the Colt's Patent Firearms Co., Pratt & Whitney Co., Underwood Typewriter Co., Taylor & Fenn Co., Whitney Mfg. Co., Hartford Electric Light Co., and others. Most of these have war contracts.

The Hartford Electric Light Co. already has signed up 160 of its men, or 70 per cent of its entire force, for farm work. Many of them have had farm experience. The company has arranged to send out its men in units of from 5 to 10 over a period of 25 weeks, guaranteeing that at least five men will be constantly engaged in helping farmers during this period. The company furthermore will take the men by automobile to the farms so that the farmers benefitted will be put to no trouble or expense for transportation. This unit and transportation scheme will be generally employed.

The Connecticut plan is novel in that the manufacturers and other employers releasing men for farm work will continue their wages during their farm engagements, while the farmers using them will pay the wages due the men as farm hands to their regular employers. Manufacturers are patriotically willing to sacrifice the difference while the employees left in the plants are in turn offering to do their bits by carrying along the tasks of their comrades temporarily engaged in food production.

Farmers of the State are enthusiastic over the project and will make their calls to the United States Employment Service as the men are needed. Since many of the industrial workers formerly were engaged in farming, Connecticut agriculturists will be given not only additional workers but skilled workers as well.

Testing Materials Society Meeting

A discussion on "Co-operation in Industrial Research" promises to be one of the features of the annual meeting of the American Society for Testing Materials to take place at the Hotel Traymore, Atlantic City, N. J., June 25 to 28, inclusive. The industrial research subject is scheduled for Wednesday evening, June 26, and among the speakers announced are Dr. Henry M. Howe, past president of the American society and also of the International Association for Testing Materials; Dr. John Johnston, secretary National Research Council, Washington; Dr. A. D. Little, president Arthur D. Little, Inc., Boston; Dr. Charles L. Seese, chemical director, E. I. du Pont de Nemours & Co., Wilmington, Del., and Frank E. Gorrell, secretary National Canners' Association, Washington.

A discussion on "Season and Corrosion Cracking of Brass: Its Prevention and Means for Testing the Tendency Thereto," is a special topic for the session occurring on Thursday morning, June 27.

Besides the reports of committee, which will doubtless constitute, as usual, the topics of consideration of the meeting, a number of papers are announced including: "A Simple Type of Brinell Testing Machine," by A. V. de Forest, Stratford, Conn.; "A New Type of Brinel Machine," by J. G. Ayers, Jr., metallurgist, Hyatt Roller Bearing Co., Newark, N. J.; "Transverse Testing Under Non-Uniformly Distributed Load as Applied to Airplane Wing Ribs," by I. H. Cowdrey, Massachusetts Institute of Technology; "Sumner Elastic-Limit Recorder," by J. L. Jones, Westinghouse Electric and Mfg. Co., Pittsburgh, and C. H. Marshall; "Cast Steel Anchor-Chain," by James French, chief surveyor, Lloyds' Register of Shipping; "Grain Growth of Cold Wrought Metals," by D. J. McAdam, Jr., and "Changes Within the Critical Range of a Given Steel," by J. G. Ayers, Jr.

For president for the next society year G. H. Clamer, second vice-president Ajax Metal Co., Philadelphia, has been nominated. The other regular nominations are: Vice-president, George S. Webster, director department of wharves, docks and ferries, Philadelphia; members of executive committee, Guilliaem Aertsen, Midvale Steel & Ordnance Co., Philadelphia; Dr. G. K. Burgess, chief of division of metallurgy, Bureau of Standards, Washington; G. B. Heckel, editor *Drugs, Oils and Paints*, Philadelphia, and K. W. Zimmerschied, metallurgical engineer, General Motors Co., Detroit.

The total membership of the society is now 2203, a net gain of 36 since the last annual meeting.

Meeting of American Iron and Steel Institute Postponed One Week

James T. McCleary, secretary of the American Iron and Steel Institute, has issued the following notice to members:

The members of the American Iron and Steel Institute are leaders in all good works in their respective communities. The usual date for the spring meeting is the fourth Friday in May. This year there seemed to be no reason for changing the rule, and May 24 was selected for the meeting. It now appears that the week containing May 24 will be the culminating week of the second Hundred Million Dollar Drive of the Red Cross, and a number of our members have expressed a desire to be at home that week. So it has been decided to postpone the New York meeting from May 24, as heretofore announced, to May 31. Detailed announcements will be made later.

Third Liberty Loan a Great Success

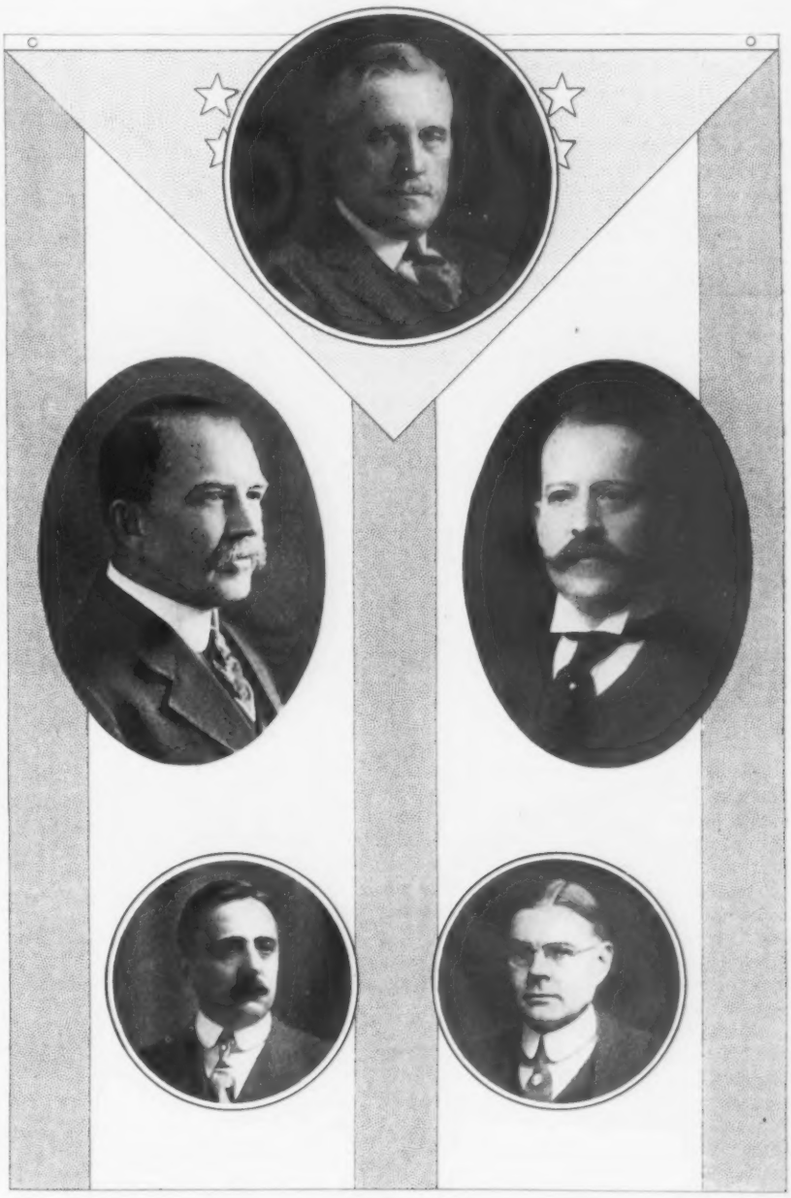
A Record Never Equaled by Any Nation—Iron and Steel Industries and Farmers Make Splendid Showing—At Least 17,000,000 Individual Purchasers

WASHINGTON, May 7.—The third Liberty loan canvass closed with a whirlwind finish at midnight on Saturday and although the official returns cannot be made up until after May 13, reports received indicate that the subscriptions will aggregate more than $4,000,000,000, or an oversubscription of approximately 85 per cent. The loan is declared by Secretary McAdoo to be the most successful ever floated by any nation, this statement being based not so much upon the volume of sales as upon the wide distribution of the loan. No less than 17,000,000 individual purchasers participated in the loan, which means that one person in every six or nearly one to every family, bought one or more bonds. With only a part of Saturday's returns showing, the number of subscribers in each Federal reserve district is estimated by the Treasury Department as follows: New York, 4,000,000; Chicago, 2,498,000; Cleveland, 1,561,979; Philadelphia, 1,200,000; Boston, 1,200,000; San Francisco, 1,000,000; Atlanta, 1,000,000; Minneapolis, 1,000,000; Kansas City, 900,000; Richmond, 900,000; St. Louis, 866,342, and Dallas, 850,000.

There was much jubilation among the Liberty loan executives over the marvelous record of sales distribution, which is taken as ample evidence that the third loan has been in fact a people's loan and that banking institutions have been called upon to assume a smaller share of the burden of this loan than any war loan yet floated. It is pointed out that the banks have been kept unimpaired, and that the wide distribution means a minimum of financial displacement on account of the loan. Even though the volume of sales probably will not reach the total of the second Liberty loan, the general results of the third Liberty loan are far more pleasing to Treasury Department officials, and considering the fact that the loan came at a time when the country is being called upon to raise billions in income and excess profit taxes, the results are considered remarkable. It is not denied that the income taxes requirements greatly curtailed subscriptions in the large financial centers.

Another important fact to be taken into consideration is that the Treasury Department had indicated that it would accept only half of the oversubscriptions of the second Liberty loan, whereas it had reserved the right to accept all of the oversubscriptions to the third Liberty loan.

Secretary McAdoo was especially pleased with the wide distribution of the loan among farmers. The agricultural States generally were the first States to attain their quotas. The entire section of the United States west of the Mississippi River had become "honor" territory before the closing day of the loan. This achievement is considered all the more remarkable in view of the fact that this loan came at the time of the year when farmers borrow money rather than lend. The results of the third loan indicate magnificent participation by farmers in the fourth loan if it should come during the harvest season.



Iron, Steel and Machinery Men Who Were Prominent in the Third Liberty Loan Campaign

At the top, S. J. Llewellyn, president of the Interstate Iron & Steel Co., Chicago, chairman of the Iron and Steel and Kindred Trades Division in Chicago. Center left, George H. Richards, manager foreign department, Remington Typewriter Co., chairman of the Hardware, Metals and Allied Trades Committee of the Rainbow Division, New York. Center right, J. W. Lane, president of the E. W. Bliss Co., New York, chairman of the Machinery and Machine Tool Trades Committee, Rainbow Division of the New York Liberty Loan Committee. Lower left, Henry D. Miles, president of the Buffalo Foundry & Machine Co., chairman of the Steel Industries Committee for the third Liberty loan in Buffalo. Lower right, William Breeden, district sales manager of the Lackawanna Steel Co., Philadelphia, chairman Group No. 1, comprising iron, steel and allied lines in the Philadelphia district

New York will lead all states in the number of individual subscribers with a total of nearly 4,000,000. Pennsylvania probably will be second, but the figures are not in. Illinois will rank third with nearly a million and a quarter. Ohio is expected to be one of the banner states with a total of nearly one million individual subscribers and Iowa with a total of 520,000 subscribers out of a population of slightly over 2,000,000, will rank in the first percentage division. Indiana's individual subscribers will approximate 400,000, Michigan's 375,000 and Wisconsin's 280,000.

The sensational finish in the Atlanta district, which has been reported at the bottom of the percentage table throughout the campaign, has attracted much attention. While the details are not yet at hand, telegraphic advices from the managers of the campaign at Atlanta predict that the district will eventually show an oversubscription of 50 per cent. The universal distribution of the loan in the Atlanta district is shown by the fact that everyone of the 427 counties in the district recorded an oversubscription.

Cleveland's Splendid Record

CLEVELAND, May 7.—Cleveland went "over the top" in the third Liberty loan campaign and the impetus of the drive brought in subscriptions well in excess of the $55,000,000 allotment. Among the largest and most liberal subscribers were the iron and steel plants, ore firms and manufacturing interests in the metal-working field, most of which made their subscriptions early in the campaign. The subscriptions from employees of industrial plants were very gratifying, and far exceeded the goal set at the start of the campaign. From these plants 125,000 subscriptions were received, representing over 70 per cent of the employees, and the total amount from this source was $9,500,000. A large number of plants were placed on the honor roll by securing a subscription from every employee in the plant. Some of the larger late subscriptions from industrial companies were the following:

McMyler-Interstate Co.	$250,000
Cuyahoga Stamping & Machine Co.	25,000
Cleveland Welding & Mfg. Co.	25,000
Forest City & Walworth Run Foundry Co.	20,000
Henry Miller Foundry Co.	25,000
Betz-Pierce Co.	50,000
Kirk-Latty Mfg. Co.	40,000
Horsburgh Forge Co.	10,000
Interstate Foundry Co. (additional)	25,000
National Malleable Castings Co. (additional)	140,000
B. F. Bourne and Bourne-Fuller Co. (additional)	86,000
Cleveland Worm & Gear Co.	20,000
Cleveland Osborn Mfg. Co.	20,000
Cleveland Machine & Mfg. Co.	20,000
Electric Control & Mfg. Co.	15,000

Subscriptions were received from 9978 employees of the nine Cleveland plants of the American Steel & Wire Co., amounting to $930,650. The total subscriptions of this company's employees in Cleveland numbered 10,187, and amounted to $969,700. Subscriptions from employees in its Salem, Ohio, plant were 356, amounting to $36,350. Over 60 Cleveland industrial plants, including the American Steel & Wire Co., qualified for admission to the Liberty loan honor roll by selling a bond to each of its employees. Some of these 100 per cent subscriptions are as follows:

Westinghouse Electric & Mfg. Co., 1045 employees, $64,500; the White Co., 4785 employees, $275,000; McKinney Steel Co., 3164 employees, $321,850; Interstate Foundry Co., 775 employees, $48,000; Hydraulic Pressed Steel Co., 1867 employees, $121,850; Templars Motor Corporation, 275 employees, $25,000; Cleveland Pneumatic Tool Co., 200 employees, $10,000; West Steel Castings Co., 220 employees, $15,000; Cleveland Punch & Shear Works Co., 150 employees, $15,350; Grant Motor Car Co., 450 employees, $23,000; F. B. Stearns Co., 670 employees, $41,050; Allyne-Ryan Foundry Co., 706 employees, $45,550; Chisholm-Moore Mfg. Co., 570 employees, $35,800; Wellman-Seaver-Morgan Co., 926 employees, $54,150; Elwell-Parker Electric Co., 400 employees, $25,600; Pickands-Mather & Co., 110 employees, $35,000; Wood & Spencer Co., 300 employees, $26,000; Lincoln Electric Co., 360 employees, $26,000; Semet-Solvay Co., 190 employees, $50,000; Premier Aluminum Foundry Co., 276 employees, $17,000; Fanner Mfg. Co., 300 employees, $20,150; Atlas Bolt & Screw Co., 390 employees, $23,000.

Other industrial companies whose employees have made large subscriptions include the following: National Acme Co., $100,000; Brown Hoisting Machinery Co., $65,000; Cleveland-Cliffs Iron Co., $14,000; Globe Machine & Stamping Co., $15,000; National Malleable Castings Co., $40,000; Cleveland Osborn Mfg. Co., $23,250; Forest City Machine & Forging Co., $30,000; American Shipbuilding Co., $125,000.

Great Totals in New York

In the New York district, Rainbow Division, the Hardware, Metals and Allied Trades Committee made a magnificent showing with subscriptions amounting to $61,625,000. George H. Richards was the chairman. Excellent showing also made by the Mining Industries Committee, which obtained subscriptions amounting to $27,950,250 and the Machinery and Machine Tool Committee, whose subscriptions amounted to $18,250,600. Among the New York subscriptions not heretofore reported were the following:

Westinghouse Electric & Mfg. Co.	$1,000,000
Charles D. Barney & Co., New York and Philadelphia offices	500,000
U. S. Steel Products Co.	500,000
Nassau Smelting & Refining Co.	210,000
Cyclops Steel Co.	60,000
Safety Insulated Wire & Cable Co.	56,000
Cutler-Hammer Mfg. Co.	50,000
Independent Lamp & Wire Works	310,000
Waclark Wire Co.	50,000
Carpenter Steel Co.	26,000
American Wringer Co.	25,000
Metal & Thermit Corporation	150,000
Federal Shipbuilding Co.	100,000
Nassau Smelting & Refining Works, Ltd. (additional)	100,000
International Nickel Co. (additional)	250,000
Babcock & Wilcox Co. (additional)	250,000
Continental Iron Works	100,000
Babcock & Wilcox Co.	750,000
Pressed Steel Car Co. (additional)	200,000
Chrome Steel Works	50,000
Russell, Burdsall & Ward Bolt & Nut Co.	76,150
Gaston, Williams & Wigmore	50,000
American Smelting & Refining Co. employees	36,150
United States Steel Corporation (additional)	5,000,000
General Electric Co.	1,000,000
Underwood Typewriter Co. (for itself and employees)	726,000
Automatic Sprinkler Co. of America (and employees)	166,350
General Electric Co., New York, office employees	100,000
New Jersey Zinc Co. (additional)	100,000
Peerless Truck & Motor Corporation	100,000
American Brake Shoe & Foundry Co. (additional)	100,000
Manning, Maxwell & Moore, Inc.	67,450
J. H. Williams Co. employees (additional)	50,000
American Locomotive Co. and employees (additional)	500,000
A. Schrader's Sons, Inc., and employees	280,000
Automatic Sprinkler Co. of America (additional)	166,350
Employees of E. W. Bliss Co.	200,000
Employees of J. H. Williams & Co.	50,000
T. A. Gillespie Co. (additional)	150,000
Davis-Bouronville Co.	40,000
Garvin Machine Co. (additional)	40,000
Ingersoll-Rand Co.	50,000
Employees of Neptune Master Co.	32,000

Success in Chicago

CHICAGO, May 4.—Announcement of an additional subscription of $750,000 by the Illinois Steel Co., made to-day, helped to swell the total of bonds purchased by the iron and steel Liberty loan division in Chicago. At this writing there is no doubt that the division is well "over the top." Its quota was $9,900,000, and that amount will probably be exceeded when scattered ends are drawn in. The total subscription of the Steel Corporation applicable to this district is over $3,100,000.

The Machinery Club of Chicago is proud of its achievement. Although all its members had subscribed, it set itself to raise $25,000 in the name of the club, making a special appeal at its second anniversary dinner on the night of April 30. Before the dinner was over $35,000 was subscribed. To-day the total stands at $44,700, and $50,000 is in sight, as subscriptions are still coming in. The quota of the machine tool and supply trade was $3,000,000, and this amount will be exceeded.

A pleasing feature of the campaign is presented by Lake County, Ind., which embraces the industrial section at the lower end of Lake Michigan, an iron, steel

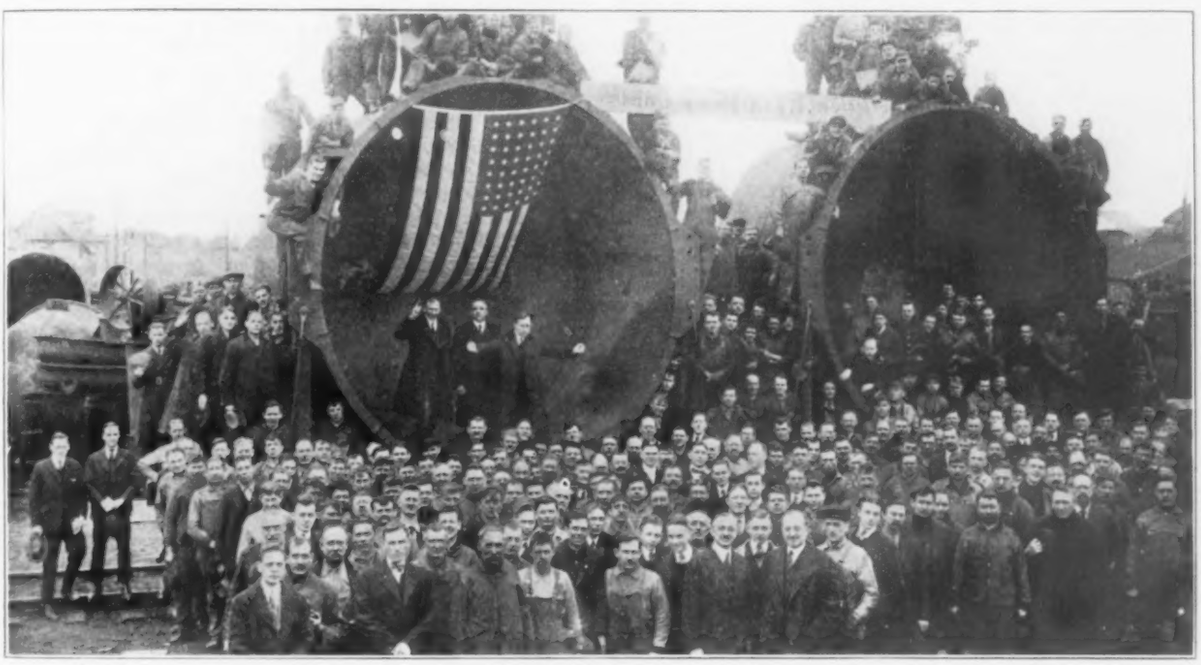
and coke producing center. With a population of approximately 120,000 the county has 50,000 actual purchasers of bonds valued at over $6,000,000, or more than double its quota of $3,000,000. The showing is the more remarkable in view of the conglomerate nature of the population, a very large percentage being foreign-born workers.

St. Louis First Over the Top

ST. LOUIS, May 4.—The St. Louis Federal Reserve district, first to go "over the top" in the grand aggregate of the district quota, and the city of St. Louis, likewise, in going "over the top," were, as in the former loans, magnificently assisted by the iron and steel and the machinery interests as a whole in the subscriptions and in the collateral work, including contributions to the advertisising fund by which the campaign was kept before the public in the press. The subscription lists have not yet been classified, as the fight has been for totals rather than individual figures or glory. The system of campaigning was organized on the lines of getting results, and they were obtained by an amazingly thorough system of presentation and solicitation, with the result that very few citizens of the city and likewise very few visitors during the period of the campaign escaped an opportunity to subscribe. The campaign was carried to the last analysis in the operating plants, as well as in the offices and among the officers. The totals and the complete details will not be known for some time to come, but included in the subscriptions have been these, which are also likely to be shown to be increased when the final reports are made: Joseph T. Ryerson branch, $65,000; American Brake Co., $50,000; Scullin Steel Co., $150,000; Fulton Iron Works, $121,000; Wagner Electric Co., $250,000; Laclede Steel Co., $100,000; Commonwealth Steel Co., $245,00; American Steel Foundries, local branch, $25,000; Campbell Iron Co., $5,000; Sligo Iron Co., $12,000; Green Carwheel Co., $2,000; Southern Railway Supply Co., $2,500; Illinois Steel Warehouse Co., $100,000; Southern Coal & Coke Co., $40,000; Christopher & Simpson, $25,000; Colcord, Wright Machinery Co., $15,000; Carnegie Steel Co., local branch, $100,000; Curtis Mfg. Co., $150,000; Crane Co., $18,000; Smith & Davis Mfg. Co., $47,000; Wrought Iron Range Co., $350,000; American Car & Foundry Co., local offices, $125,000. Some of these figures include in part subscriptions of employees, etc., while others are for the concerns mentioned and only in part with other lists to come in.

Buffalo 25 Per Cent in Excess of Allotment

The third Liberty loan at Buffalo went over the top with a rush and exceeded the allotment by 25 per cent, or over $7,000,000 more than the quota assigned by the Government. The total raised by the Iron and Steel Industries Committee was $4,658,000, or $1,158,000 more than the amount allotted to it. Just before the close of the campaign the members of the committee held "rallies" at 43 of the plants under its supervision, where the total of subscriptions was not considered quite up to the proper mark, and in 14 of these plants succeeded in securing subscriptions from all that had not previously subscribed, making 100 per cent, and in the other plants at which the rallies were held secured additional subscribers to make 90 per cent, or over, of all employes at each plant. The total raised by the committee representing machinery and steam and gas engines trades was $909,100 and the amount raised by the scrap dealers' committee was $210,150.



EMPLOYEES OF THE BUFFALO FOUNDRY & MACHINE CO.'S PLANT ASSEMBLED TO HEAR LIBERTY LOAN SPEECHES

Standing Under the Flag in the Center Is Henry D. Miles, President of the Company and Chairman of the Iron and Steel Committee, with Christopher Grauer and Mr. Olszcarowski on Either Side, Speakers on the Occasion. The employees are standing beside a car loaded for shipment, containing two large pieces of apparatus to be used in the construction of one of the large nitrate plants being erected by the Government. Many of these castings will be required. Owing to the extreme height of the castings, it is necessary to move the cars over a carefully established route in order to obtain sufficient overhead clearance, in some places certain tracks and switches being specified to avoid bridges or other obstructions

Westinghouse Record

PITTSBURGH, May 4.—A total of $2,144,800 subscribed by employees was the record of a 10-day Liberty loan campaign in the organization of the Westinghouse Electric & Mfg. Co. With 30,384 subscribers from the company's various plants and district offces, the "bogie" set for this and the total subscription figure was largely exceeded.

Milwaukee's Loyalty

MILWAUKEE, Wis., May 6.—A 50 per cent oversubscription to the third Liberty loan is Milwaukee's answer to critics of the city's loyalty to the Government of the United States. Although official figures are not yet available, and pledges still are being received, the total amount subscribed by the Milwaukee district is approximately $22,000,000, compared with the minimum quota of $14,600,000.

The Metal Trades Group, with a nominal allotment of $3,500,000, has exceeded a total subscription of $6,000,000, according to unofficial figures.

ELECTRIC CARBON TOOL STEEL

Details of British Practice in a 3-Ton Heroult Furnace

DETAILS of the production of carbon tool steel in a Heroult electric furnace in England are given by John A. Holden in an article in the London *Iron and Coal Trades Review*. An abstract follows:

War conditions have stimulated British manufacturers to adopt the electric process on a large scale. The enormous demand for tool and alloy steels, together with the difficulty in obtaining adequate supplies of Swedish iron, made the inception of the electric furnace a necessity. In this country the arc furnace is favored, and although there are many designs of such furnaces, this article will deal with the Heroult type, because it is the one with which the author has had experience.

For the production of carbon tool steel this electric furnace is particularly suitable. Cheap raw material, consisting of ordinary carbon turnings, stamping trimmings, etc., can be refined and converted into tool steel of the first quality. The cost of production is low, being less than one-half of the cost of making crucible steel. The charge is under direct control throughout; the purity of the product is unquestionable; the composition required is assured, for it is determined only by the accuracy of the bath sample analysis.

In order to obtain the necessary purity the furnace is lined with a basic hearth. Burnt dolomite, crushed and mixed with hot tar and rammed hard, gives a very serviceable bottom. The walls up to and two courses above the slag line are built of magnesite bricks; above this silica bricks are used throughout. In fact, the furnace is lined in a manner similar to the basic open-hearth furnace. The capacity varies between 10 cwt. and 10 tons. The 3-ton is a very useful size for making carbon tool steels, and it will be convenient to describe the working of a furnace of this capacity.

Process Different from All Others

The working differs materially from all other processes. The operations can be divided into two distinct sections:

Oxidation of nearly all the carbon, manganese, silicon and phosphorus.

Reduction of the sulphur and of the oxides left in the metal from the preceding operation.

It may appear paradoxical to remove the carbon at one stage, and add it at a later stage, but it must be remembered that to oxidize the phosphorus to about 0.01 per cent the carbon must be reduced to at least 0.10 per cent.

The furnace being hot from a previous cast, the melter examines it to determine the amount of fettling required. Usually the slag line only requires attention. The lime is charged on the furnace bottom, followed by the iron ore, and in turn by a substantial layer of turnings. The slag line is then fettled with burnt dolomite, crushed to pass through a ¾-in. sieve. If crop ends, or casting heads, etc., form a portion of the charge, they are thrown on to the bed of turnings. After this a further charge of turnings is added. In order to protect the lining the scrap is charged high round the walls, no harm being done if it reaches the roof. To facilitate melting, the scrap should be lower in the middle of the furnace.

Details of a Typical Heat

The current is turned on, and by operating the electrodes by hand a steady load is soon obtained. The time for melting is determined by: Size of the charge; current supply; condition of the furnace lining; character of the scrap, and skill of the furnacemen. Below is given the complete history of a typical heat made in a 3-ton Heroult furnace operating on a 3-phase current of 4500 amps. on each phase, at 90 volts. The lining was in good condition, and the furnace was operated by skilled men.

If the scrap is light it will not be possible to get the whole charge in the furnace at first. In this case the remainder is added as soon as there is room for it. If the available scrap is very light it is found economical to crush it either in a pug mill or in a stone breaker. From time to time the melter examines his slag. If it assumes a brownish color more iron ore is added. During the period of melting the slag is maintained very fluid, and contains an excess of oxide of iron. As soon as the charge is hot enough, and sufficiently oxidized, the scrap clinging round the banks is carefully pulled into the bath. After a short interval the electrodes are run up high above the level of the metal; the current is switched off, and the furnace tilted to pour off slag, care being taken that no metal is teemed. The bulk of the slag having been poured, the remainder is skimmed off with rakes. If the metal is well oxidized there will be no boil on the surface, and brown fumes will be seen to escape through the electrode holes in the roof. It is important that the bath should be well skimmed, particularly when the steel is to be recarburized. When skimmed the furnace is tilted back to the horizontal position and recarburized to the calculated degree. For recarburizing anthracite "breaker duff" gives consistent results. It dissolves rapidly, and can be relied upon to give about 55 per cent efficiency.

After recarburizing, ferrosilicon is added in the proportion of 1 lb. of 50 per cent ferrosilicon for every 2 cwts. of steel charged. Fluorspar and lime are then added to form a slag, and the current switched on. For finishing off a lower pressure is employed, usually about 70 volts. As soon as the steel is hot enough to pour well, a sample is taken for carbon analysis. While this is estimated the steel is deoxidized, and simultaneously the slag is put into the right condition. The deoxidation of the metal is effected by means of ferrosilicon; the deoxidation of the slag is effected by anthracite, or ferrosilicon dust, or both; the electrodes in a measure also deoxidize the slag; the carbon reduces the oxides with the formation of carbon monoxide.

The Finishing Slag

A good finishing slag is either cream or white in color, porous and viscous in appearance. At first the slag is brown and mobile; with cautious additions of anthracite and ferrosilicon dust a satisfactory slag is obtained. Care is taken not to add an excess of anthracite, or a gray slag loaded with calcium carbide will be obtained, resulting in erratic carbon percentages in the steel.

From time to time samples of the steel are taken and poured into a small mold; the first two or three are "wild." An addition of ferrosilicon is made after each (equivalent to a theoretical 0.06 per cent. Si) until one is obtained which solidifies without rising. The steel, of course, is given time for each addition to react with the dissolved oxides. To obtain a "dead" melted steel and a "white" slag occupies about 35 minutes from the time of recarburizing. Steel made in either the basic arc or induction furnace has a well-known peculiarity: it cannot be cast into sound ingots unless the silicon content is at least 0.10 per cent. The silicon is often a stumbling block to the novice. However, with experience it is possible to judge the silicon percentage nearly as accurately as a chemist can estimate it.

During the whole time of deoxidizing, the temperature of the bath is carefully watched, the heat being controlled by adjusting the amperage on each phase. As soon as the steel is dead melted, and the slag is in good condition, the final additions are made. Ferromanganese or spiegel is added to give the required manganese, and if the carbon is not high enough an addition of pig-iron is made. In a correctly finished steel these additions will yield 100 per cent efficiency.

The Steps in Detail

8.35 a. m.—Commenced charging.

9 a. m.—Current switched on. The furnace contained 3 tons 5 cwt. of scrap, 1¼ cwt. of lime, and 1 cwt. of iron ore.

10.30 a. m.—Remainder of the scrap (10 cwt.) added.

11.20 a. m.—½ cwt. of iron ore added.

11.40 a. m.—Sample taken, hammered and quenched from about 900 deg. C. Bending test proved that the metal contained very little carbon.

11.50 a. m.—Banks cleaned.

12 p. m.—Furnace tilted to remove the oxidizing slag.

12.10 p. m.—Bath recarburized with 125 lb. of anthracite, 37 lb. of 50 per cent ferrosilicon added, followed by 1 cwt. of lime and 35 lb. of fluorspar.

12.25 p. m.—Sample taken for carbon estimation.

12.26 p. m.—Sample poured. Steel very wild; 10 lb. of lump ferrosilicon and 10 lb. of anthracite added.

12.34 p. m.—28 lb. of lime and 5 lb. of dust ferrosilicon added.

12.39 p. m.—Steel almost dead melted; slag light brown in color; 5 lb. of anthracite and 5 lb. of ferrosilicon added.

12.46 p. m.—Steel dead melted—silicon about 0.12 per cent; slag white and frothy. Final additions made. (Spiegel 100 lb., pig 78 lb., 50 per cent ferrosilicon 10 lb.)

12.55 p. m.—Steel cast.

Total charge, 3 tons 15 cwt.
Total anthracite, 140 lb.
Total ferrosilicon, 67 lb.
Steel in the ladle, 3 tons 10 cwt.
Duration of the heat, 3 hr. 55 min.
Current used, 2205 kw.
Kilowatts per ton in the ladle, 630.
Maximum demand on the power station, 650 kw. per hr.

Analytical Data

Bath when the first slag was removed: C, 0.07 per cent; Mn, 0.08 per cent; S, 0.043 per cent; P, 0.007 per cent.

Bath at 12:25 p. m.: C, 0.90 per cent.

Steel when cast: C, 0.99 per cent; Mn, 0.35 per cent; Si, 0.18 per cent; S, 0.018 per cent; P, 0.007 per cent.

Specification: C, 0.98 to 1.03 per cent; Mn, 0.3 to 0.4 per cent; Si, 0.15 to 0.20 per cent; S and P, 0.025 per cent max.

First slag: $SiO_2 = 7.80$ per cent; $FeO = 39.30$ per cent; $CaO = 38.80$ per cent; $P_2O_5 = 0.85$ per cent. Second slag: $SiO_2 = 23.85$ per cent; FeO = trace; $CaO = 68.80$ per cent.

Plans of the Missouri Iron & Steel Corporation

The Missouri Iron & Steel Corporation, St. Louis, recently organized for the purpose of manufacturing pig iron in its blast furnace in Howell County, Mo., from ores taken from its nearby mines, using limestone from its own quarries and charcoal made from wood taken from its own lands, as referred to in THE IRON AGE of April 25, has acquired the Carson mine, about 2 miles from West Plains. This mine has been shipping ore for 17 years and the company's mining engineers, Robert W. Hunt & Co. of Chicago, say that it promises to be one of the largest iron ore deposits in the entire South.

In addition to the Carson mine the company has acquired 19 other separate mineral deposits, some of which, in its opinion, contain more ore than the Carson mine, which has an outcropping and prospected area of about 55 acres. The deposit is now about 80 ft. deep at one end, with a probable iron ore horizon of 125 ft.

This company has bought for cash a blast furnace operated some time ago at Jefferson, Tex., has had a crew of men working on it for the last two months, and it is now ready for delivery and erection.

The company is erecting its blast furnace in Howell County, Mo., adjacent to its mines, limestone quarries and fuel resources, in order to eliminate freight charges on the raw materials, as this not only avoids a heavy addition to the cost of manufacture but, the company believe, will also make it independent of future congested freight conditions, such as existed throughout the United States this last winter, it being believed that it can always get about enough cars under all conditions to transport its finished product, whereas it might not be able to obtain enough cars to bring in the raw materials.

A careful survey of its logical trade territory also reveals the fact that even points in Nebraska and farther West and Northwest obtain most of their pig iron shipments from Birmingham, Ala., which will give the company an advantage in cost of delivery, inasmuch as its district will consume many times as much pig iron as it expects to offer for sale.

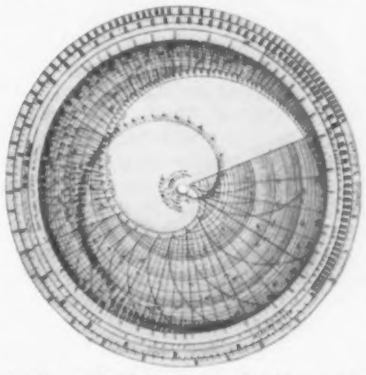
This company has also acquired three valuable water power sites and expects later to install electric furnaces, provided, of course, further investment prove very practical under the conditions it will have to meet.

For the present it is engaged in the work of removing and erecting its first unit of blast furnaces, and in preparing to install by-product charcoal ovens through which it can recover wood alcohol, acetate of lime and tar and oils from the wood.

It is believed that ample finances will be provided by sources that have already supplied substantial amounts, and the capitalization of the company, $6,000,000, has purposely been made large enough to provide funds for any future expense, it being desired by the organizers to create a large industry that will not only manufacture pig iron, but eventually turn out finished iron and steel products for which there is a market in its own trade territory. The officers are: William R. Haight, president; Theo. F. Phillipi, vice-president; F. J. Stuart, treasurer; Hicks Clark, secretary.

Computer for Determining Gas Duct Dimensions

A ductometer, so-called, for readily computing the proportions of ventilating systems and gas ducts, generally, has been brought out by: R. D. Ward, Geo. P. Bender, C. E., 120 Broadway, New York. It consists of one graduated celluloid disk superimposed over another; and is based upon the Weisbach and other standard formulas for the flow of gases. Calculations are simplified, it is asserted, by employing such common factors as the quantity of air per minute in cubic feet, velocity in feet per minute, duct size in inches, friction or loss of head in inches of water, etc. Depending upon the factors given, a solution of the problem may be approached from a half-dozen different ways. The instrument has a range of values from 1 x 1 in. to 120 x 120 in. in duct size, with equivalent round and rectangular shapes together with proper corrections for both the shape of area and for the corresponding change in friction.



Quick Calculation of Problems In Connection with the Flow of Air or Other Gas Through Ducts of Round or Rectangular Cross-Section Is Possible by Manipulation of this Computing Device

The ductometer is especially useful when testing the duct system for quantity; for, having the velocity pressure from a pilot tube reading—on the basis of 100 ft. of duct—the proper indicator is set over the measurement on the friction scale and opposite the equivalent square duct is found the cubic feet of air per minute being conveyed; or, if two static readings be taken at a given interval in a duct of uniform size their difference, when based on 100 ft. of duct, is used in the same manner. This feature enables the designer to make the proper connections to existing duct work.

There are also other features, as that the outside scale is equivalent to a 9-in. slide rule, while by the use of the indicator curve the squares and square roots as well as the result of numbers multiplied by each other can be found.

The Skoda Engineering Works of Pilsen, Bohemia, intends to adapt its plant after the war to the production of agricultural implements and motor tractors.

CO-OPERATION OF STEEL MEN

Shipbuilding Program Advanced Under the Schwab-Replogle Regime

WASHINGTON, May 7.—The shipbuilding program has received a tremendous impetus during the past fortnight as the result of the vigorous co-operation of Director General Charles M. Schwab of the Emergency Fleet Corporation, and J. Leonard Replogle, Director of Steel Supply for the War Industries Board. Before Mr. Schwab accepted his present post he called on Mr. Replogle to discuss the steel situation and to ascertain the attitude of the War Industries Board with regard to the priority necessary to secure plates and shapes to keep the steel shipyards busy. Without a steady flow of steel, Mr. Schwab said, no amount of energy devoted to the work of speeding up the building program could avail anything, but with plenty of steel coming forward in proper sequence he was confident that an enormous tonnage of ships could be produced during the current calendar year. Mr. Replogle promptly assured Mr. Schwab that he could count upon all possible help from the War Industries Board and that the director of steel purchases would be behind him "one hundred and ten per cent."

Mr. Replogle has been as good as his word. Following the now famous hearing accorded the Director of Steel Supply by the Senate Committee on Commerce, at which Chairman Hurley of the Shipping Board declared he would immediately take steps to inform the War Industries Board of the exact sequence in which plates and shapes were required by all the steel shipyards and would also instruct the yard managers to specify promptly against all their outstanding orders for steel, Mr. Replogle has spurred up the plate mills and the fabricating shops to unprecedented efforts to keep the yards busy and to accumulate banks of shapes and plates from which to draw as rapidly as may be necessary. All shipyard steel is now of the first degree of priority and the Railroad Administration is manifesting the liveliest interest in providing transportation for fuel and material for the plate mills and to handle the products of the mills and fabricating shops with a minimum of delay.

Mr. Schwab's appointment has had an amazing effect upon the attitude of all the employees of the Shipping Board, the Emergency Fleet Corporation and of the various shipyards of the country. A spirit of co-operation not heretofore evidenced has developed in every quarter, red-tape is being unceremoniously slashed and reports indicate a very heavy increase in per capita output. The first evidence of Mr. Schwab's popularity developed soon after his appointment in connection with the announcement that he would take the offices of the Emergency Fleet Corporation to Philadelphia. This meant the removal from Washington of about 2500 clerks, draftsmen, engineers, etc., all of whom had established some ties in the capital city. There was at first a strong protest against the change among the employees of the corporation and many veiled hints at resignations. The majority of the staff could easily have secured transfers to other work that would have kept them in Washington, but after Mr. Schwab had spent an hour strolling through the offices and talking with the employees opposition vanished and when the move to Philadelphia is made about May 15 practically everybody will go cheerfully and proudly.

Further evidence of Mr. Schwab's standing with the skilled workers of the country was given when he attended the launching of the 5548-ton steel collier Tuckahoe at the yard of the New York Shipbuilding Corporation in Camden, N. J., on May 5, just 27 working days after the laying of her keel on April 8. So rapidly was the work prosecuted on this vessel that she was 90 per cent completed when she left the ways and on May 30 she will be ready to take cargo. The ship was christened by Miss Helen Hurley, the chairman's 12-year-old daughter. A letter from President Wilson congratulating the workmen and executive staff of the New York Shipbuilding Corporation was read, also a copy of a cablegram sent by Chairman Hurley to General Pershing in which he said:

> Management and workmen of the New York Shipbuilding Corporation have just established a world record by launching a steel ship of 5500 dead weight tons in 27 days. The army of 550,000 men in the American shipyards thus show that they are working shoulder to shoulder with their comrades in the trenches. The patriotic spirit shown by the workmen of this country exists in every shipyard in America.

When Mr. Schwab came forward to address the workmen of the yard he was vociferously cheered for several minutes. Turning to Thomas Mason, hull superintendent of the yard, who had charge of the construction of the Tuckahoe, Mr. Schwab embraced him heartily and presented him with a gold watch as a token of his appreciation of the splendid record make in turning out the ship. In thanking Mr. Schwab for the gift Mason pledged the hearty co-operation of every workman in the yard and predicted that the record in the case of the Tuchahoe would speedily be lowered.

For the week ending Monday, April 29, the shipyards of the country launched steel and wood hulls totaling 41,105 tons, making the grand total of the launchings since the new shipbuilding program got under way, 1,405,000 tons. Rapid progress is being made in finishing off requisitioned steel ships of which 50,000 tons were completed during the week ending April 29.

Over-seas shipping will be further added to from this time on by a steady flow of completed new vessels from the Great Lakes shipyards. With the reopening of the lakes and the St. Lawrence River to navigation 34 ships built at the Great Lakes yards during the fall, winter, and spring are now either en route or loading for trans-Atlantic service. They total approximately 100,000. Of 23 ships in the Great Lakes shipyards scheduled to be completed in May, 16 are reported already so far advanced that they have begun to take on crews and cargoes. The Bureau of Operations of the Shipping Board has allocated these new ships to the New England coal-carrying trade. They approximate a total of 50,000 tons.

Clearing House for War Orders

At a meeting of manufacturers in the Cleveland district comprising northern Ohio and the three western counties of Pennsylvania, held at the Chamber of Commerce, Cleveland, May 1, plans were perfected for an organization of all manufacturing plants in the district that are engaged in war work. It was decided to divide the Cleveland production zone into eight districts, which will be organized along the lines of the Cleveland War Industries Commission. Each division committee will make a survey of the production capacity of the plants in its respective district, and the information will be indexed and made available for the Ordnance Bureau. It is planned that when the organization is in operation, the Cleveland War Commission will serve as the central clearing house for the district for war orders from the Government. Plans and specifications will be sent to the Cleveland office and by that distributed to the division headquarters, and by these to the manufacturers in their respective divisions. The headquarters of the eight divisions into which the Cleveland district has been divided will be Cleveland, Toledo, Lima, Columbus, Mansfield, Canton, Youngstown, and Erie, Pa.

The Wilputte Coke Oven Corporation has been awarded a contract for the construction of 40 Wilputte ovens, with extensions to the existing by-product plant and benzol plant, by the Citizens Gas Co., Indianapolis. The plant is expected to be in operation by December, 1918.

Bartlett, Parsons & Co., 60 Wall Street, New York, are to build a plant at Rumford, Me., for the manufacture of ferrosilicon. The plant will have an area of about 10,000 sq. ft.

RAILROAD TRACK PROBLEM

Distribution of Crossties and Rail Design to Ameliorate Existing Weaknesses

IN a paper recently presented before the Engineers' Society of Western Pennsylvania supplementing a previous one on track defects reviewed in THE IRON AGE, George H. Barbour, mechanical engineer, Pittsburgh, gave calculations which he made to show advantages which he attaches to increased bearing on the ballast and decreased lateral spans between fastenings involved in the use of 16-in. crossties with 24-in. centers. His results, he said, show that a 136-lb. squat rail, designed with its center of gravity as low as possible, on 16-in. crossties 24-in. centers is almost 50 per cent stronger than the 136-lb. Lehigh Valley on its standard crossties on 22-in. centers.

In regard to the problems of rail design he emphasized the complexities brought in by the possibilities of rail and wheel contact and the resultant peening of the railhead. All things considered, he believes a broader railhead the only improvement possible that would appeal to the American engineer; but a broader railhead he emphasized means a higher center of gravity with increased stresses in the flanges of the rail so that a proper balance between width of head and stress in the critical fibers of the flange appears to him to be the crux of the problem.

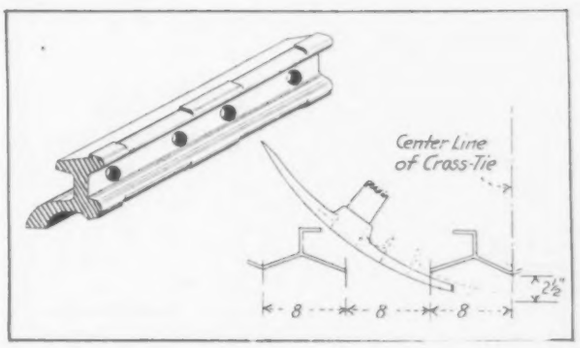
However, as the railhead wears, he held that the center of gravity of the rail lowers tending to increase the stresses in the railhead in relation to those in the flange, and so he considers it advantageous to increase the head further until the center of gravity is raised to a point where the stresses in the head and flange balance at the period of intermediate wear. On the assumption that the average weight of rail used today on main lines does not exceed 100 lb., he believes that the girder strength of the rail should be increased and should satisfy the span from wheel to wheel rather than from crosstie to crosstie. He held further that the 130 to 136-lb. rails recently introduced are none too strong, that the lateral strength of the rail should be materially increased and that the rail should have more frequent lateral fastenings.

Discussion

Discussing the paper G. W. Snyder, principal assistant engineer, Pittsburgh division, Pennsylvania Railroad, took exception to Mr. Barbour's method of investigation, his opinion being that no application of such a method is likely to give results of value. On the Pennsylvania Railroad, he said, the total number of rail failures in main running tracks reported in the years 1915 and 1916 was 5431, 31 per cent of which started in the head, 29 per cent in the web, 8 per cent in the base, while 15 per cent were due to transverse fissures and 17 per cent to miscellaneous causes. He did not believe that over 10 per cent of the failures which originated in the base arose from stresses in the extreme fibers, and so contended that Mr. Barbour's calculations could not apply to more than 0.8 per cent of the failures on the Pennsylvania Railroad in the two years reported.

Mr. Snyder did not believe 8 in. sufficient tamping space between ties and he doubted that the lateral strength of rails needs increase. High carbon content in his opinion is the remedy for flange wear, but he held that this will not be reduced by change in rail section. The weak part of the rail, he contended, is the joint and increasing the number of ties, which he believes is the practical method of increasing the bearing on the ballast will, in his opinion, be of no use.

G. W. Vaughan, engineer of maintenance of way, New York Central Railroad, New York, held 4 in. sufficient tamping space between crossties and that this made possible the spacing of 9-in. crossties 13-in. centers which, in his belief, made unnecessary the use of 16 or 20-in. ties. He also held that railheads at the present time are made about as broad as they should be from a practical standpoint. He contended that the rail is not worn out at the period of intermediate wear and that no good would result from increasing the depth of railhead. His experience has been that better track is assured by increasing the number of ties under the rail, and he believes the strength of the rail should be increased by increasing its height.



The Splice Bar Has But Three Points of Contact with the Rail Head and Three with the Flange, Leaving Portions Between Contacts Free for Deflections. The crossties are designed to permit proper tamping with 8 in. between the ties

Replying to the discussion Mr. Barbour presented a sketch, herewith reproduced, as refutation of Mr. Snyder's contention that 8 in. between crossties is not sufficient for tamping. The weight of the tie indicated, he said, is 23 lb. He referred to Mr. Snyder's data on Pennsylvania Railroad rail failures as substantiating his contention that the flange has been favored to the detriment of the head and as sufficient argument for raising the center of gravity. He pointed out that 46 per cent of the failures were traceable to critical fibers in the head against 8 per cent to the base. Referring to Mr. Snyder's contention that as the weak part of the track is in the joint, no good will result from increasing the number of ties, Mr. Barbour held that failures in splice bars and battered ends of rails are due to repeated alternate deflections of the rail, and he considers that increased ties and the splice bar shown may ameliorate this condition. It is his belief that the Pennsylvania Railroad did not note any improvement in adding two ties per rail because it did not reduce the depth of ballast in proportion.

New Aluminum Alloy Containing Beryllium

A new alloy consisting of aluminum and beryllium is covered by a patent (U. S. 1,254,987—Jan. 29, 1918) granted to Hugh S. Cooper, Cleveland. Such an alloy is claimed to be stronger, harder, and possessing a higher melting point than aluminum; it is also stated to be from 5 to 30 per cent lighter, depending on the amount of beryllium. It is said to be permanent in either cold or boiling water, to retain a polish for a considerable time, to be easy to machine and to make excellent castings. Within certain limits the alloy is ductile and malleable and may be drawn, rolled or pressed. The patentee has found that small amounts of beryllium, 1 to 5 per cent, combined with aluminum, greatly increase the tensile strength of aluminum even beyond that obtained with magnesium.

Manganese Deposits in Texas

J. P. Nash, of the bureau of economic geology and technology of the University of Texas, has returned from Val Verde county, where he spent some time investigating the manganese deposits that were discovered there recently. He says that there are two separate properties of the mineral now being prospected, and that there are about 40 carloads of it in sight. The ore runs from 5 to 40 per cent in manganese. The mineral is found largely in caves, where it takes the form of large porous boulders in many instances. The beds are situated close to the Rio Grande and adjacent to the Southern Pacific Railroad.

The Federal Export Corporation has removed its offices to 42 Broadway, New York.

Developing Minerals for Ferroalloys

Price-Fixing by President and Large Revolving Fund Eliminated—The Steel Corporation and Ferromanganese

WASHINGTON, May 7.—The action of the House of Representatives in emasculating the Foster bill, providing for the control and distribution of ferroalloys and various other metals and their minerals which are of special value for war purposes, has not disheartened the representatives of the Administration who have co-operated in urging this measure upon Congress. The managers of the bill hope to restore in the Senate the salient features eliminated by the House.

Vital Provisions Stricken Out

The ruthless slashing of the Foster bill just before its passage by the House was a great disappointment to Chairman Foster of the House committee and especially to the members of the War Industries Board, who have devoted a great deal of time and attention to demonstrating the practicability of the joint project of stimulating the production of domestic deposits of war minerals and of conserving for war transportation purposes a considerable amount of tonnage now employed in bringing such minerals or their metals to the United States from foreign countries. The House with the utmost deliberation, after several days' debate, struck out the provision authorizing the President to fix the prices to be paid for all the metals and minerals covered by the bill and also reduced the revolving fund appropriation from $50,000,000 to $10,000,000. If the House had rejected the bill in toto it could not have more significantly indicated its opposition to the entire project.

From the outset the chief argument advanced in favor of the Foster bill was the practical certainty that if the President were given the power to fix the prices of the war minerals for a period of two years the result would be to so stimulate production that the needs of the entire country, even under the extraordinary conditions now prevailing, would be fully met; but without such guaranty owners of domestic deposits would have little or no inducement to development for the reason that the present high market prices of ferroalloys and the war minerals are due to the war and are therefore likely to decline sharply as soon as the conflict is over, especially as the return of peace would release an unlimited amount of merchant tonnage with which to bring into this country a sufficient supply of cheaper foreign commodities to meet all needs. It is therefore obvious that in striking out the price-fixing section the House has destroyed the chief principle underlying the project contemplated by the Foster measure.

Recommended Revolving Fund $150,000,000

In cutting down the appropriation from $50,000,000 to $10,000,000 the House destroyed the last shred of the original scheme devised by the War Industries Board. Chairman Bernard M. Baruch, who prides himself upon his reputation as a close trader, declared with much emphasis before the House committee that the bill ought to provide a revolving fund of $150,000,000 in order to guarantee the war industries an adequate supply of ferroalloys and the important minerals embraced within the scope of the project. Mr. Baruch pointed out that it was not proposed to scatter broadcast the appropriation carried by the bill but that it would be used merely as capital with which to enable the President to conduct transactions which in all probability would involve very little risk and which might be carried through without a dollar of actual expense to the taxpayers of the country beyond the mere cost of administering the measure. He warned the committee, however, that the transactions would run into large figures and that ample capital would greatly facilitate the project, which was not without experimental features.

The Steel Trade and Manganese

The members of the War Industries Board and other Administration officials who are working together for the passage of the Foster bill regard the opposition that has grown up against it with a great deal of anxiety. They feel that they are shouldering a tremendous responsibility in asking the steel industry, for example, to give up its present sources of supply for manganese, chromite, magnesite, etc., and in a great war crisis attempt the experiment of relying upon undeveloped and unknown deposits of these minerals in order to assist in the conservation of a comparatively small amount of shipping space. The entire project is still regarded by many experts as chimerical and it is doubtful if a single metallurgical engineer could be found in the entire country who would recommend the adoption of the Foster plan unless guaranteed the use of a liberal appropriation and the power to stimulate output by fixing generous prices for the commodities in question. The representatives of the steel makers who have conferred with the War Industries Board have looked askance at the Foster bill and have somewhat grudgingly agreed to co-operate in testing it upon full assurances that Congress would provide adequate legislation guaranteeing every safeguard that might promise success. The War Industries Board as well as the leaders of the House and Senate Committees on Mines and Mining have already heard from manufacturers, some of whom protest vigorously against making experiments concerning so important a matter as the manganese supply. It is also pointed out that the War Industries Board is now urging iron and steel producers not only to utilize their facilities to the utmost but also to increase them as speedily and extensively as possible.

Representative Towner of Iowa, a member of the House Committee on Mines and Mining, argued, as did others, that the bill does not provide for the use of the appropriation except as a revolving fund the great majority of which must necessarily come back into the treasury; he therefore contended that $10,000,000 would be ample for the purpose. He added that experience had already demonstrated that when appropriations were made under such conditions the executive officers ultimately found some means of spending the entire amount.

The Steel Corporation and Ferromanganese

The tariff was again adverted to in the closing hours of the debate. Mr. Cooper of Wisconsin declared that an adequate appropriation would have to be made to meet the present situation in view of the fact that Congress had failed to stimulate production by tariff protection. "If we cannot import from foreign countries for lack of shipping," he said, "then it becomes of paramount importance that we shall make ferromanganese in sufficient quantities to meet the needs of the Government and of all manufacturers for, as we are informed, the steel trust, the vast producer and user of steel and iron, makes its own ferromanganese and does not sell any of it, while other producers of steel must import their ferromanganese."

Representative Green of Iowa disputed certain statements made concerning the conditions that prevailed with reference to the manufacture of ferroalloys at the time of the passage of the Underwood-Simmons tariff act. He said:

> Under the Payne law there was a tariff of $2.50 a ton on ferromanganese, but manganese ore was free from duty. Manganese ore came into this country in large quantities

and was smelted by the United States Steel Corporation. Consequently it made, through its smelters, nearly all the ferromanganese in the country, and it would not have made any difference with that situation whether the tariff was on or off. The Steel Corporation would still have done the smelting, because it was the only concern having smelters to carry on that manufacture. Now, unless I misunderstand the purpose of the bill, vast and extensive as are its powers, it is not intended at this time that the United States Government will go into the business of smelting manganese ore, although in one section power is given to take over undeveloped smelters. So the Steel Corporation will still go on making nearly all the ferromanganese that is made in this country unless the Government not only takes the undeveloped smelters but the developed smelters of the steel trust or builds smelters itself and operates them. I do not find any power to do either in the bill. Apparently, these powers were overlooked, or they would have been put in the bill by the bureau chiefs who framed it. In any event, there is nothing in the bill that will tend to relieve the people from the exactions of the steel trust, and if there was it would require no great amount of money as long as the Government does not go into the business itself and only uses the funds for the purpose of stimulating the industry.

Two amendments were adopted without a roll call, one providing that the act shall cease to be effective six months after the end of the war and the other limiting the maximum salary to be paid under the bill "for any scientific, technical or administrative service" to $4,500 per annum. In view of the fact that the Foster plan contemplates the employment of a large force of metallurgists, engineers and other highly trained experts, it would appear that the members of the House are relying upon the services of a considerable number of "dollar-a-year patriots."

The Senate Committee on Mines and Mining is being urged to make an early report on the Foster bill and in the meantime missionary work is being done in the House on behalf of the Administration with a view to bringing about an agreement to accept the projected Senate amendments which may possibly be in the nature of compromises. W. L. C.

Decision in Resale Price Fixing Case

The Federal Trade Commission has just disposed of the first of the cases in which complaints have been issued charging violations of law through fixing the resale price of articles, and an order to cease and desist from this practice has just been issued by it in the case of Chester Kent & Co., Inc., of Boston, manufacturers of proprietary medicines. The order, the first in cases of this character, forbids the company to

(a) Indicate to dealers the prices for which its proprietary or patent medicines shall be resold.

(b) Securing agreements from dealers to adhere to such prices.

(c) Refusing to sell to dealers who fail to adhere to such prices.

(d) Refusing to sell to dealers who fail to adhere to such prices upon the same terms as dealers who do so adhere.

(e) Furnishing any advantage to dealers who adhere to the resale prices, while refusing similar treatment to dealers who do not adhere to the prices.

All-Water Line Between Great Lakes and France

The shipment of 2000 tons of fabricated light railroad track from a Lake Erie port this week for use behind the American lines in France marked the beginning of practically a regular all-water line of communication between the Great Lake ports and the American base port in France. As boats for the Emergency Fleet Corporation are turned out by Lake shipyards, which will be at fairly regular intervals of a few days, they will be loaded with war material at Lake Michigan and Lake Erie ports for shipment to France, and it is probable that much of the war material from cities along the Lakes in the Central West will be shipped this way during the season of Lake transportation. Many of the boats built on the Great Lakes during the winter started out during the past few days loaded with wheat for the Allies.

WILL CONTROL PIG IRON

Important Action Taken at Meeting Held in Cleveland

CLEVELAND, May 7—(*By Wire*).—A meeting of the Pig Iron, Ore and Lake Transportation Committee of the American Iron and Steel Institute, of which H. G. Dalton is chairman, was held in Cleveland, May 3, to devise plans for mobilizing the pig iron industry of the country and regulating the distribution of iron, so that makers of material for the Government will be given a preference in shipments. The matter was taken up by this committee at the request of the War Industries Board. At present a great deal of pig iron, particularly in foundry and malleable grades, is being absorbed in industries that are not war essentials. Some of the producers have canvassed the trade, and in making shipments have given preference to foundries doing war essential work, but, as this policy has not been generally followed, many producers do not know for what purpose the iron is being used.

The pig iron committee decided to make a complete canvass of all the pig iron producers of the country. Forms are being prepared which will be sent to the furnaces and the latter will make reports as to the amount of iron sold, condition of order books, amount going to war essentials and to purely commercial industries. Furnaces will also be supplied with forms to distribute to the iron trade on which consumers will report the products for which their iron is used.

When the survey is completed the committee will devise plans for the distribution of pig iron orders, so that war essential industries will be supplied first. In the meantime, the present system of allocation will be continued. It is probable that the plan will be very similar to that used in the allotment of steel. The needs of three Government departments, the Emergency Fleet, Navy and War Departments, will be taken care of first and what iron is left after the Government's needs are supplied will go to essential commercial industries.

Various commercial industries, such as stove manufacturers and makers of sanitary equipment, will have their supply cut off unless there is a surplus of iron after supplying the war essential industries. Only a small per cent of the work of many foundries is in war essentials, and if these are compelled to limit their production to this work they say they will suffer seriously, as they have taken the Government work on the basis of running their plants at about full capacity. The proposed control has caused some foundries to urge shipments on contracts, evidently hoping to enlarge their stock piles.

New Shipyard at Buffalo

The Ferguson Steel & Iron Co., Buffalo, has broken ground for a shipyard on the Buffalo River at Buffalo. The yard will build vessels for the United States Navy, but later on will be equipped for building all types of steel craft. The plans call for the laying of the first keels by July 1. Capt. James E. Ferguson, president of the company, was recently detached from the United States Signal Corps at the request of the Navy Department to undertake this shipbuilding project. The first vessels to be built will be 151 ft. long, 1000 tons dead weight tonnage, all of a standard type. Most of the steel will be fabricated in the shop of the Ferguson Steel & Iron Co. Edward P. Butts, Springfield, Mass., will be manager of the shipbuilding department.

The St. Louis office of the Sprague Electric Works of the General Electric Co: has been moved to room 1352 Pierce Building.

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Maximum Steel for War

When the Government's war activities began about a year ago, trusting largely to voluntary co-operation on the part of producers of the various commodities required, the Secretary of the Navy intimated that a "dishonorable list" might be published at some time in the future, if material were furnished for such a list. So far as the steel trade is concerned, the practical fact is that there is now no need for lists, dishonorable or otherwise, for the reason that the Government's requirements have grown so greatly that they have come under the scope of the law, which authorizes the Administration to commandeer material. As regards the "one price for all" dictum, the third item and the last in the list, "the general public," is almost out of the reckoning, and it is unthinkable that any quibble would be raised at this time as to whether or not the second item in the list, steel for our Allies, comes under the law which authorizes the Administration to commandeer material. The material is purchased with money we loan to our Allies, and there has been talk of remitting the debts at the close of the war.

As to those who produce the great bulk of the steel there is not and never has been any question. The manufacturers have been anxious to meet the Government's requirements to the fullest extent. If there is a change among these manufacturers, arising out of the additional pressure for steel the authorities have been exerting for a month past, it is not a change in the spirit of co-operation, but a change in opinion as to the proportion of the steel output the various war activities will require. It is no more than a change in the appraisal of the tonnage needed. There was no occasion for a change in spirit or purpose, for that, with the majority, has existed right along.

As to a possible small minority, who may perhaps in recent months have devoted an undue amount of attention to private or commercial orders, the American Iron and Steel Institute has been proceeding along co-operative lines, beginning with the operation of seeking a pledge to Government service from each individual manufacturer.

For the Government no such course is necessary. If there are any manufacturers who still require additional attention, the proportion of their capacity is so small that the Government can easily fill them with orders about which there can be no quibble, legal or otherwise, all within very plain and explicit law relating to the Government's power of commandeering facilities the product of which it needs. If the Government seeks more material than it is receiving, naturally it should turn to plant facilities that are engaged in unnecessary work.

There was plain speaking at the recent meeting in New York, by the Director of Steel Supply, and doubtless plain speaking was necessary. There is every reason to expect that there will be no further occasion.

As to the appraisal of the amount of steel requisite to safeguard fully the war activities, practically no doubt has been left that a very large volume of steel is required, a volume that for a time will tax the resources of the steel industry, when it faces great difficulties in operation and can hardly hope to approach closely a rate of operating at capacity, and when in addition it is recognized that there are many so-called "commercial" employments of steel that are more or less vital in helping to win the war. The policy of secrecy that has surrounded most of the war work, a policy no doubt dictated by important considerations, has had the disadvantage that even those possessed of the most information have not been given occasion to realize fully the extent of the requirements. A factor not appreciated, moreover, until the beginning of the decisive period of the war, is the loss of man power in the Allied countries—a loss that has thrown a greater burden on our steel manufacturers than anything they had reckoned.

Of statements of tonnage there have been plenty in the inner circles, but tonnages alone prove nothing, as the time element enters in. There is no total quantity of steel that the war work requires; it is a quantity of steel per day, per week and per month. Of rates per month it has been very difficult for the highest authorities themselves to judge, and it is their duty to make outside estimates and err, if at all, on the side of providing too much steel rather than too little.

Ambassador Gerard said recently, referring to the success of German propaganda in Russia:

> Fortunately, they cannot propaganda this country as they can Russia, because we have great publications that go all over the country and have unified the whole country and the whole continent. *That is why I am against the postal zone law passed in the last Congress*

putting an extra tax on papers sent from the cities where published.

They forget that, whether these publications go from Philadelphia, from San Francisco, or from Chicago, it is the exchange of these papers from and to all parts of the country that makes one universal, united America. They unify the sentiment, and that is worth far more in this war than the small amount of extra postage which the Government will obtain.

It is amazing that in the greatest crisis the nation has known since the American Revolution a Congress should be found willing to pass a law which works directly against national unity of thought and purpose and for sectionalism in the people's reading. The zone system should be repealed. An equitable, country-wide rate on publications can be and should be arrived at; but to penalize readers living at a distance from the point of publication and thus to restrict the circulation of all national periodicals is the height of injustice and folly. In the case of the business press, in particular, such restriction would weaken an influence that has done more than any other to marshal industry quickly and effectively behind the war plans of the Government.

Jobbers and War Steel

Now that the steel manufacturers have pledged to one another and to representatives of the Government to subordinate every demand upon their output to the necessities of the Government and its Allies, it would be well to commit to a like course those who control the warehouse stocks of iron and steel throughout the country. As we have already indicated, the War Industries Board has not ignored distributers in its calculations for the future. It has recognized, also, that proper allowance must be made for the pig iron and the rolled steel needed by manufacturers who make stock products which are drawn upon constantly by others having contracts from the Government. It is well known that the shipyards are almost daily sending emergency orders to the warehouses. Even plates are often bought in this way, and on a great variety of products there is constant piecing out from jobbers' stocks.

Now that steel manufacturers are concentrating on Government needs, stocks in warehouses should be applied to the same end to the largest degree possible. The Government has not cared heretofore to go farther down the line than the manufacturers of iron and steel and of various staple products, such as nuts, bolts and rivets. The steel manufacturers' committee, after being charged by the War Industries Board with the duty of aligning jobbers' prices with those fixed for the mills, decided that $20 a ton would be a fair jobber's profit on certain products and $25 on others. These margins were accepted as sufficient by large jobbing interests, but departures from them were not uncommon. It safely may be said that the new restrictions now in force on the amount of material allowed to jobbers will be administered according to the record of the various distributers in the matter of prices, as well as the application of their stocks to essential industries. Those who have refused to be governed by official prices are not likely to fare well in the ensuing period of scant shipments from mills to warehouses.

It would be helpful in a high degree if the jobbers promptly organized to make the stocks they now have on hand go farthest in supplying the needs of shipyards and munition works and of manufacturers engaged on Government work. An opportunity exists here which we believe iron and steel merchants will be prompt to grasp.

Bessemer Rails

The well edited and usually well informed *Railway Age* makes a plea against the ordering of Bessemer rails by the Railroad Administration. It says that "railroad engineers are much concerned" over the proposal and asserts that while winning the war is the main thing "existing practices should not be disturbed unless such disturbance will contribute to the success of our military efforts." Then follows a long argument having for its object proof that facilities do not exist for the rolling of any large tonnage of Bessemer rails. This is a style of criticism much indulged in these days, resting upon the incorrect assumption that the Washington authorities are in danger of placing large orders which those receiving them are unable to fill. Doubtless some mistakes of that sort were made in the early months of the war, but it is altogether absurd to assume for a moment, with the close cooperation now existing between the Government and the steel trade, that any orders will be placed and accepted which do not fit in the general program. The steel trade as organized for war work is fully able to inform the Government what tonnage of Bessemer rails it can furnish, and the advantages or disadvantages involved in furnishing the tonnage.

Apart from the making of this ill-timed assumption, however, the *Railway Age* displays an ignorance of facts that is quite unusual to its columns. It asserts that the stampede some years ago from Bessemer to open-hearth steel was due to the fact that "about 1908, high-grade Bessemer ores suitable for rail making began to run out," the emphasis being on the "high-grade" as if it referred to the quality of steel to be produced. What occurred was the partial exhaustion of Bessemer ores of the highest iron content, whereby the cost of making the steel increased. The ores were "high grade" in relation to cheapness in manufacturing rather than in relation to quality of product. Nevertheless the flat statement is made: "The depletion of the high-grade Bessemer ores has continued so that a return to this class of steel can only be made at the sacrifice of service and of safety in the track." That is not true. Much Bessemer ore is available, and it is of such character as to produce as good Bessemer steel as formerly. In this connection it may be mentioned that when the "sanitary can" was developed it was accepted that the tight seaming necessary could be done only with tin plate made from open-hearth steel, and that remained the accepted trade theory until the stress of Government demand for open-hearth steel for shells, ship plates, etc., made it necessary to find employment for Bessemer steel. The result is that very nearly all tin plate made to-day is from

Bessemer steel and the manufacture of sanitary cans is converted to the product, thus furnishing an instance of Bessemer steel being applicable to a use for which it was formerly held entirely unsuitable, whereas in the case of rails Bessemer steel was the favorite material for a third of a century.

The *Railway Age* then proceeds to argue that "the reduction in the Bessemer capacity of the country which has taken place also acts as a controlling factor." That is clearly not true. No Bessemer steel departments have been actually abandoned since the Duquesne department passed in September, 1907, and the Homestead department in July, 1912. Some Bessemer departments, as at Steelton and Sparrows Point, have had their functions changed in part, whereby they blow metal for duplexing, but as a rule when this service has been performed some straight Bessemer steel can still be produced. Our contemporary reaches the conclusion that "this leaves only two mills in a position to roll Bessemer rails to any advantage, both of these being located in western Pennsylvania." Presumably reference is made to Johnstown and Edgar Thomson, but the expression "only two" is not suggestive of the facts, since the Johnstown plant has 300,000 tons rail rolling capacity and double that capacity in Bessemer ingots. The Franklin plant at Johnstown, which is open-hearth entirely, is not depended on for rails. As to Edgar Thomson, it is distinctly a Bessemer plant with more than 1,000,000 tons Bessemer capacity, the open-hearth capacity recently added being smaller.

After these "only two" Bessemer rail plants, the *Railway Age* has missed, apart from Steelton and Sparrows Point, mentioned above, Lackawanna, with nearly as much Bessemer as open-hearth capacity; the Ohio works of the Carnegie Steel Co., with a large rail mill and approximately as much Bessemer as open-hearth steel; the Lorain plant, with nearly as much Bessemer as open-hearth steel, and a girder rail mill which in times of vastly less stress than the present has been called upon to roll T rails; the South Chicago rail mill, with 250,000 tons rail capacity and three times as much Bessemer steel making capacity, and Colorado, with a large rail mill and more Bessemer steel than open-hearth. The *Railway Age* mentions the Colorado mill only to point out how far west open-hearth rails can be produced, having assumed that Colorado cannot produce Bessemer rails.

It is curious indeed that the rail situation should be so misunderstood. What has occurred in the past dozen years has been that to accommodate the railroads the steel trade has provided new capacity for making open-hearth rails, without losing to any extent its ability to produce Bessemer rails. In 1906 there was produced 3,791,459 tons of Bessemer rails, and probably more could be produced to-day if the steel could be spared and rolling capacity were not needed for shell steel, whereas the Railroad Administration is thinking in hundreds of thousands of tons. The *Railway Age* would be performing a proper function if it argued that Bessemer rails are by analysis, structure, or performance inferior to open-hearth rails, but this it does not do. It must not claim that Bessemer rails have become poor through the disappearance of Bessemer ores, or that there is not converting and rolling capacity to supply the Railroad Administration's requirements.

The Railroad Administration by all means should call for Bessemer rails. Every ton of our steel making capacity must be utilized, and for utilizing the Bessemer capacity rails furnish an excellent means. There are other products, such as tin plate, which are properly made from Bessemer steel, but there are not enough of them. The general argument, as to using Bessemer steel until the total available supply is allotted, applies to various products, but on one head it applies to rails and to nothing else, and that is in connection with conserving the manganese supply. Every ton of Bessemer rails made is a ton of steel made without ferromanganese, spiegeleisen being used instead. The manganese argument applies to rails only, and not to tin plate and other Bessemer steel commodities.

The Manganese Restrictions

If March imports of only 19,300 tons of manganese ore are a measure of the extent to which the Government has restricted the receipts of this important commodity, then the outlook is not reassuring. It will be less so if also the imports of British ferromanganese be prohibited as now planned.

The case is one of simple mathematics. Since the United States entered the war and since the ferroalloy industry has been under the direction of Government and other committees, it has been known that the steel industry has had little more than three months' supply of manganese ahead of it at any time. Even so it has been necessary to make extraordinary efforts in production of ferromanganese and in the importation of high-grade ores. Record figures have been made in both. Our production of standard alloy advanced to over 23,750 tons per month in 1917 and the ore importations to nearly 52,500 tons per month. In the meantime importations of British metal have been constantly declining, so that the officially estimated requirements of the steel industry—26,000 to 28,000 tons of ferromanganese per month—have only been approximated and a three months' supply assured.

It does not seem possible that with a 50 to 60 per cent curtailment in manganese ore imports and a complete stoppage of receipts of foreign alloy, the steel industry can be assured of even a hand-to-mouth supply of manganese. Expressed in high-grade manganese ore, the annual needs of the industry are 700,000 to 800,000 tons. The March imports mean only 232,000 tons per year; but if the total be reduced by only 50 per cent experience does not indicate that the deficiency can be made up by ores of a domestic origin, convertible even into lower standard alloys of proper composition. After over three years of high prices and insistent demand, our domestic ore output did not reach 150,000 tons in 1917. To make up for the restriction now going into effect, at least 300,000 to 400,000 tons of domestic ore of 35 to 50 per cent manganese content must be forthcoming. From what is known of the deposits in this country no such stimulation of output can be looked for in time to meet this year's requirements, even under the princely Gov-

ernment endowment provided by the Foster bill, as described elsewhere in our Washington correspondence. Moreover, an impairment of present facilities for producing ferromanganese is not the least of possible dangers, for it will not be easy to switch from high-grade manganese ore to ores of a miscellaneous character.

One hundred per cent steel output cannot be obtained with a 50 per cent or a 75 per cent manganese supply. When steel for ships, for guns and for shells is being called for in unexpected volume it would seem that a conservative attitude on manganese is the part of wisdom and of national safety.

To Meet German Steel Competition

A combination of the steel producers of Great Britain is urged by *Engineering* of London as essential to help the British maintain a hold on world trade. Much concern is felt over the way the Germans during the last few months have made drastic revisions downward in balance sheet valuations of iron, steel and coal properties. Such large industrial organizations as the Aktien-Elektricitäts Gesellschaft credited itself before the war with only one mark on account of its numerous and immense assemblage of tools, and now it appears this reduced scale of valuation is becoming common, a dozen or so of the great firms having practically wiped out their expenditure on plant by taking sufficient sums from war profits.

Reckoned in terms of steel our contemporary suggests that British productive capacity is likely to be at least 50 per cent greater than before the war and that "we shall need an export trade of something like 7,000,000 tons or 8,000,000 tons of iron and steel a year to keep ourselves fully employed." It summarizes the benefits of organization or combination as follows: Limiting speculation and steadying prices; securing information regarding the world's requirements, which is too great an expense for any individual firm; taking larger contracts than one firm would be prepared to risk; pursuing technical developments, scientific research and investigation of raw material supplies, which can be undertaken better by co-operation. Our own Webb-Pomerene bill permitting combination for export trade has become law none too soon for the contests of big business in the world's arena.

Owing to the fact that priority orders are resulting in diverting a very large percentage of the product of iron, steel and machinery companies to domestic concerns having Government contracts and also because a large part of the shipments of war material to France are being made by Government transports and for that reason are excluded from official statistics, the monthly report of iron and steel products is being affected to a marked extent. This should be kept in mind, not only in considering the statistics for March, published elsewhere in this number of THE IRON AGE, but also throughout the remainder of the war period. In view of these facts, it is not at all surprising that the total exports of iron and steel by values in March declined 30 per cent as compared with the same month of 1917 and 33 per cent from the high record of December, 1917.

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Payment of Commissions on Scrap Allowed

The following statement of E. H. Gary, chairman of the Committee on Steel and Steel Products of the American Iron and Steel Institute has settled the prolonged controversy in regard to the payment of commissions on scrap:

"Referring to the statement made by me under date of March 28, 1918, the War Industries Board has authorized the following ruling in respect of scrap iron and steel":

(a) Consumers of scrap iron and steel employing an agent to purchase scrap for them may, at their discretion, pay as compensation for such service a sum not exceeding 3½ per cent of the agreed price at which such material is to be delivered, in cases where the agent guarantees the quality and delivery of an agreed tonnage of the material. This compensation shall be shown as a separate charge in billing; the material may not be invoiced at any price in excess of the maximums announced.

(b) Under no circumstances may a dealer or broker split or divide this extra sum which may be allowed him by a mill with any other dealer, broker or producer, and the highest price that any one under any circumstances may pay is the maximum price as stated in the announcement of the War Industries Board under date of March 26, 1918.

The power plant of the Great Lakes Power Co., Sault Ste. Marie, Ont., was destroyed by fire last week with a loss of between $500,000 and $750,000. Practically all the equipment of the plant, including dynamos, turbines, and other machinery, was destroyed. Factories of the city, including the steel plant, were forced to shut down until transformers were installed.

PIG-IRON OUTPUT GROWS

April Production Exceeds March 6000 Tons a Day

Record Ferromanganese Output — Spiegeleisen Unusually Low—Net Gain of 10 Furnaces

The pig-iron production in April was 3,288,211 gross tons as compared with 3,213,091 tons in March; and the daily rate was 109,607 tons as against 103,648 tons respectively, or a gain of 5959 tons daily. This is a 5.75 per cent advance over the rate of output for March. The estimated capacity of 113,460 tons daily from furnaces in blast May 1 indicates a further increase in the rate of production during the current month. Only 4 furnaces were blown out in April, while 14 were added to the active list, a net gain of 10. The production of ferromanganese and spiegeleisen in April was 35,511 gross tons. While this total was surpassed in March and in several months in 1917, the ferromanganese produced, 27,789 tons, was the largest ever recorded for any month. Moreover the proportion of ferromanganese to spiegeleisen also establishes a record.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from April, 1917, is as follows:

Daily Rate of Pig-Iron Production by Months—Gross Tons

	Steel Works	Merchant	Total
April, 1917	79,031	32,134	111,165
May	77,561	32,677	110,238
June	76,805	32,197	109,002
July	76,440	31,380	107,820
August	71,436	33,336	104,772
September	73,290	31,175	104,465
October	76,664	29,886	106,550
November	77,135	29,724	106,859
December	66,605	26,392	92,997
January, 1918	55,662	22,137	77,799
February	56,938	25,897	82,835
March	74,526	29,122	103,648
April	79,199	30,408	109,607

Output by Districts

The accompanying table gives the production of all coke and anthracite furnaces in April and the three months preceding:

Monthly Pig-Iron Production—Gross Tons

	Jan. (31 days)	Feb. (28 days)	Mar. (31 days)	Apr. (30 days)
New York	168,467	153,184	186,908	214,179
New Jersey	18,296	15,616	16,103	22,518
Lehigh Valley	110,285	93,502	117,161	111,312
Schuylkill Valley	41,913	46,600	74,256	89,059
Lower Susquehanna and Lebanon Valleys	49,089	38,094	69,691	66,730
Pittsburgh district	500,497	472,904	656,273	665,665
Shenango Valley	113,531	113,940	157,875	168,056
Western Pennsylvania	150,710	137,576	198,843	203,344
Maryland, Virginia and Kentucky	79,433	76,328	98,163	93,561
Wheeling district	82,752	61,547	112,106	123,211
Mahoning Valley	232,337	226,469	301,863	306,317
Central and Northern Ohio	204,527	188,423	265,710	266,476
Southern Ohio	53,102	54,579	66,794	65,522
Chicago district	247,702	295,398	506,036	530,310
Mich., Minn., Mo., Wis. Col. and Wash.	112,225	106,660	122,323	119,663
Alabama	219,167	209,586	228,988	208,820
Tennessee and Ga.	27,735	28,993	33,998	33,468
Total	2,411,768	2,319,399	3,213,091	3,288,211

The list of furnaces blown in in April comprises one Niagara and Buffalo Union Co.'s "A" stack in the Buffalo district; Musconetcong in New Jersey; one Paxton in the Lower Susquehanna Valley; Lebanon in the Lebanon Valley; Neville Island, one Isabella and one Aliquippa in the Pittsburgh district; Newcastle No. 4 and Hall in the Shenango Valley; one Johnstown in Western Pennsylvania; Haselton in the Mahoning Valley; one South Chicago stack on basic; Thomas furnace in Wisconsin; and one Bessemer in Alabama.

The furnaces blown out include Dunbar in Western Pennsylvania; Alleghany and Goshen in Virginia; and Alabama City in the Alabama district.

Production of Steel Companies

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies show the following totals of steel-making iron month by month, together with ferromanganese and spiegeleisen. These last, while stated separately, are also included in the columns of "total production."

Production of Steel Companies—Gross Tons

	Pig, total production			Spiegeleisen and ferromanganese		
	1916	1917	1918	1916	1917	1918
Jan.	2,251,035	2,244,203	1,725,513	24,866	38,792	30,695
Feb.	2,183,845	1,829,846	1,594,140	23,877	32,137	26,114
Mar.	2,365,116	2,285,430	2,310,297	29,388	36,563	39,122
Apr.	2,316,768	2,370,937	2,375,977	31,862	39,595	35,511
May	2,408,890	2,404,380	.....	35,844	37,701	.....
June	2,295,784	2,304,155	.....	38,597	30,829	.....
July	2,306,303	2,369,630	.....	31,353	43,884	.....
Aug.	2,313,122	2,214,513	.....	33,338	39,492	.....
Sept.	2,309,710	2,198,705	.....	29,451	42,235	.....
Oct.	2,530,806	2,376,589	.....	34,566	48,691	.....
Nov.	2,404,210	2,314,857	.....	44,975	34,688	.....
Dec.	2,294,620	2,064,757	.....	43,470	29,902	.....

Capacity in Blast May 1

The following table shows the number of furnaces in blast May 1 in the different districts also the number and daily capacity in gross tons of furnaces in blast April 1:

Coke and Anthracite Furnaces in Blast

Location of furnaces	Total number of stacks	May 1 — Number in blast	May 1 — Capacity per day	April 1 — Number in blast	April 1 — Capacity per day
New York:					
Buffalo	20	20	8,540	18	5,330
Ferro	1	0	0	1	116
Other N. Y.	4	3	594	3	581
New Jersey	4	4	719	3	485
Ferro	1	1	32	1	35
Pennsylvania:					
Lehigh Valley	21	12	3,500	12	3,565
Spiegel	2	2	211	2	214
Schuylkill Val.	12	10	2,924	10	2,709
Ferro and Spiegel	1	1	45	1	35
Lower Susquehanna	8	6	1,565	5	1,647
Ferro	2	2	104	2	90
Lebanon Val.	8	4	586	3	545
Ferro	3	3	158	3	142
Pittsburgh Dist.	53	49	22,622	46	21,036
Ferro and Spiegel	4	2	331	2	300
Shenango Val.	19	19	5,680	17	5,621
Western Pa.	25	23	6,645	22	6,358
Spiegel	3	1	22	2	116
Maryland	4	3	1,131	3	1,097
Wheeling District	14	11	4,107	11	3,934
Ohio:					
Mahoning Val.	26	25	10,273	24	9,867
Central and Northern	26	23	9,467	23	8,926
Southern	17	15	2,328	15	2,182
Illinois and Ind.	41	38	17,658	37	17,066
Ferro	1	1	64	1	67
Mich., Wis. and Minn.	12	10	2,677	9	2,492
Col., Mo. and Wash.	7	5	1,258	5	1,442
Ferro	1	1	100	1	2
The South:					
Virginia	16	11	1,317	13	1,348
Ferro	3	2	58	2	46
Kentucky	7	5	632	5	600
Alabama	37	31	6,996	31	7,047
Tenn. and Ga.	16	11	1,116	11	1,119
Total	419	354	113,460	344	106,160

Diagram of Pig-Iron Production and Prices

The fluctuations in pig-iron production from May, 1909, to the present time are shown in the accompanying chart. The figures represented by the heavy lines are those of daily average production by months of coke and anthracite iron. The two other curves on the chart represent monthly average prices of Southern No. 2 foundry pig iron at Cincinnati and of a local No. 2 foundry iron at furnace at Chicago. They are based on the weekly market quotations of THE IRON AGE.

The Record of Production

Production of Coke and Anthracite Pig Iron in the United States by Months Beginning Jan. 1, 1914—Gross Tons

	1914	1915	1916	1917	1918
Jan.	1,885,054	1,601,421	3,185,121	3,150,938	2,411,768
Feb.	1,888,670	1,674,771	3,087,212	2,645,247	2,319,399
Mar.	2,347,867	2,063,834	3,337,691	3,251,352	3,213,091
Apr.	2,269,655	2,116,494	3,227,768	3,334,960	3,288,211
May	2,092,686	2,263,470	3,361,073	3,417,340	.....
June	1,917,783	2,380,827	3,211,588	3,270,055	.....
July	1,957,645	2,563,420	3,224,513	3,342,438	.....
Aug.	1,995,261	2,779,647	3,203,713	3,247,947	.....
Sept.	1,882,577	2,852,561	3,202,366	3,133,954	.....
Oct.	1,778,186	3,125,491	3,508,849	3,303,038	.....
Nov.	1,518,316	3,037,308	3,311,811	3,205,794	.....
Dec.	1,515,752	3,203,322	3,178,651	2,882,918	.....
Total yr.*	23,049,752	29,662,566	39,039,356	38,185,981	.....

*These totals do not include charcoal pig iron. The 1917 production of this iron was 376,525 tons.

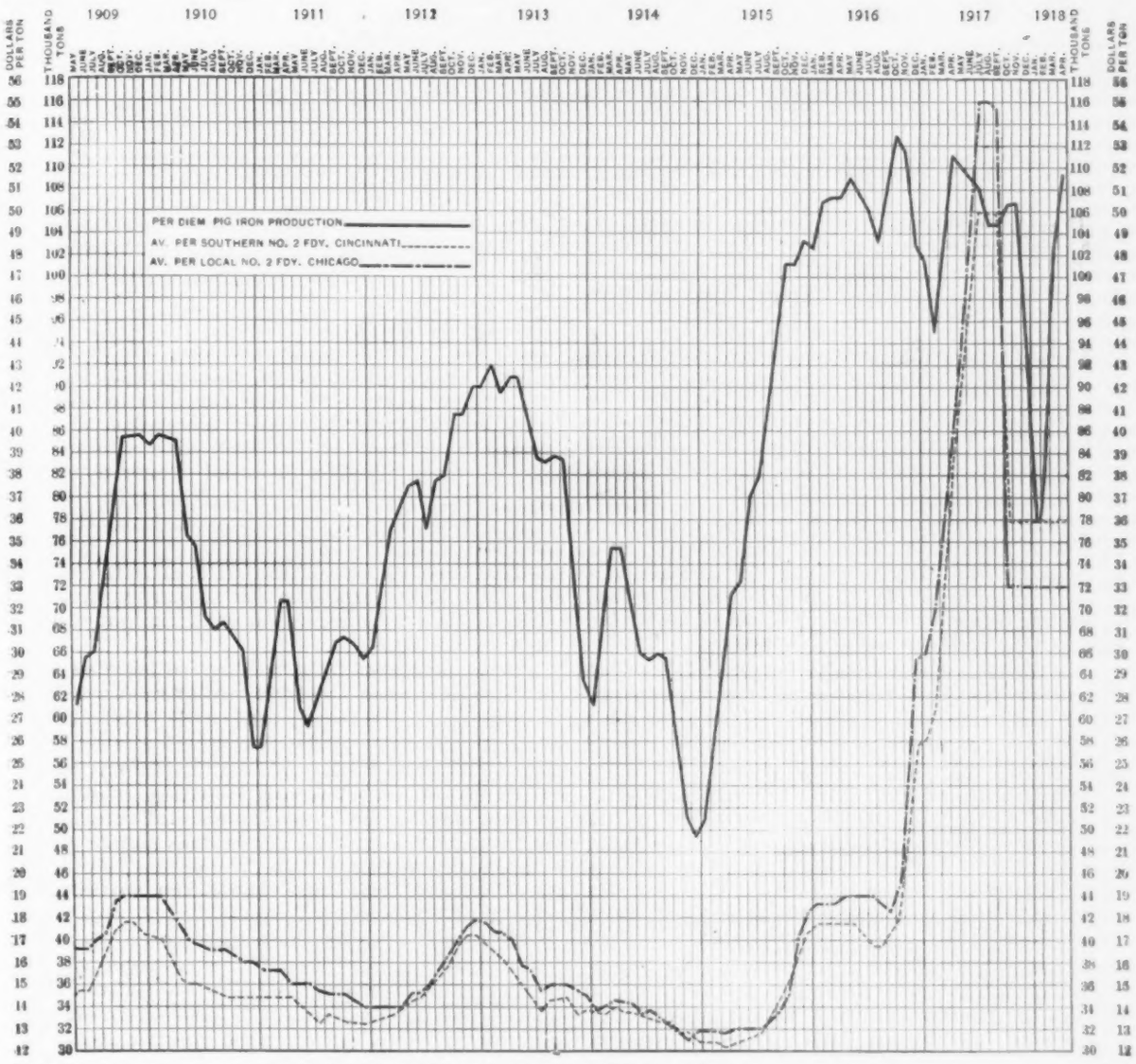

Diagram of Daily Average Production by Months of Coke and Anthracite Pig Iron in the United States from May 1, 1909, to May 1, 1918; Also of Monthly Average Prices of Southern No. 2 Foundry Iron at Cincinnati and Local No. 2 Foundry Iron at Chicago District Furnace

The figures for daily average production, beginning with January, 1911, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1911—Gross Tons

	1911	1912	1913	1914	1915	1916	1917	1918
Jan.	56,752	66,384	90,172	60,808	51,659	102,746	101,643	77,799
Feb.	64,090	72,442	92,369	67,453	59,813	106,456	94,473	82,835
Mar.	70,036	77,591	89,147	75,738	66,575	107,667	104,882	103,648
Apr.	68,836	79,181	91,759	75,665	70,550	107,592	111,165	109,607
May	61,079	81,051	91,039	67,506	73,015	108,422	110,238	.....
June	59,585	81,358	87,619	63,916	79,361	107,053	109,002	.....
July	57,841	77,738	82,601	63,150	82,691	104,017	107,820	.....
Aug.	62,150	81,046	82,057	64,363	89,666	103,346	104,772	.....
Sept.	65,903	82,128	83,531	62,753	95,085	106,745	104,465	.....
Oct.	67,811	86,722	82,133	57,361	100,822	113,189	106,550	.....
Nov.	66,648	87,697	74,453	50,611	101,244	110,394	106,859	.....
Dec.	65,912	89,766	63,987	48,896	103,333	102,537	92,997	.....

Blast Furnace Notes

Thomas Furnace Co., Milwaukee, blew in its furnace April 26. On May 1 there was not a ton of iron on the company's yard, a condition that has not existed before in its history.

The Texas Steel Co., Beaumont, expects to blow in its blast furnace at Rusk, Texas, about June 1.

On Thursday, May 2, the Carnegie Steel Co. blew in its Niles blast furnace at Niles, Ohio, which has been idle since last October. The stack will turn out about 300 tons of basic iron per day, which is used in the open-hearth steel plant at the Ohio works of the Carnegie Steel Co., at Youngstown. This company is now operating 52 of its 59 blast furnaces, and if the coke and the men can be secured, will likely start one or two more furnaces this week. All of the 26 blast furnaces in the Youngstown district were in blast on May 1 for the first time in many months. It is probable the Republic Iron & Steel Co. will blow out soon its No. 3 blast furnace at Haselton, Ohio, for relining and repairs. The Brier Hill Steel Co. will also likely blow out its Grace furnace in the near future for relining and repairs.

The Trussville Iron Co. has put in blast its furnace at Trussville, Ala., after extensive repairs. The furnace was last active in 1910. Its last previous ownership was in the bondholders of the Lacey-Buek Iron Co.

The charcoal iron furnace of the Bon Air Coal & Iron Corporation at Lyles, Tenn., will be rehabilitated, an expenditure of $150,000 being contemplated.

Complaint Against American Can Co.

WASHINGTON, May 7.—The Federal Trade Commission has issued and served on the American Can Co. a complaint charging violations of Sections 2 and 3 of the Clayton act and Section 5 of the Federal Trade Commission act, the chief allegation being that the defendant corporation has sought by various devices to restrict competition in such goods as it produces by requiring its customers to refrain from dealing with competitors and compelling them to make long-term contracts.

Iron and Steel Markets

PRODUCTION EXPANDING

Good Gains in Pig Iron and Ingots

Increased Operation on Government Work Puts the Industry on the Qui Vive

The steel trade is coming quickly into the new stride on war work. Even those of its leaders who were in the best position to gage the Government's demands in the remainder of the year were surprised at the size of the job cut out for them by the War Industries Board. There was almost equal surprise at Washington at the final showing after four months efforts to get estimates from Allies, the Army, the Navy, Railroad Administration and all essential industries.

Buying of iron and steel for general use has stopped short. No consuming industry is reported closed, but some are plainly marked for restriction. The pleasure automobile output will be cut down greatly. Pig iron shipments to stove and sanitary equipment foundries are likely to be curtailed.

There is still the belief that 60 days' concentration on war needs and the appeal this may make to workmen to increase output will relieve the situation in no small degree by July 1.

On the other hand some items in the Government schedule are growing. The steel that must be sent to Great Britain and France on General Pershing's pledges is now put at 1,250,000 tons, an increase of 500,000 tons over the estimate of four weeks ago. In the past week General Pershing has cabled for 100,000 tons of rails, and of these 76,000 tons will be supplied from the 67½-lb. rails rolled for Russia and still stored in this country. A Pennsylvania mill will roll the remaining 24,000 tons in 80-lb. sections.

A result of the concentration on war work is that selling forces of some mills will likely act to supplement Government activities in assigning accurately the specific dates of delivery required on every order to each consumer. An important steel company is passing the pledge for full co-operation with the Government down the line through its operating departments as well as its sales organization, to be individually signed.

The April pig-iron statistics bear favorably on the war steel situation, showing the largest month's output since May, 1917. At 3,288,211 tons in the 30 days of last month, production was at the rate of 109,607 tons a day, against 3,213,091 tons in March, or 103,648 tons a day. The gain was thus nearly 6000 tons a day.

On May 1, with 354 furnaces in blast, an increase of 10 in the month, production was at the rate of 113,440 tons a day, which would mean 41,400,000 tons of coke iron in a year. In 1917 the production of coke iron was 38,270,000 tons. Such a gain over last year's rate is highly significant.

Though the figures are not yet compiled, it is known that the steel ingot production in April made a good increase over the record in March.

Two steel companies have labor disputes on hand involving several thousand men and inquiry will be made by the National War Labor Board at Washington this week. Adjustment is expected, though in one case the 8-hr. day comes up as a new issue.

Leading warehouse interests have asked Washington for consideration in the matter of replenishing stocks. Records of one large house show that 85 per cent of its sales has been for Government work, largely for near-by shipyards. It is expected that jobbers will still get some steel to meet pick-up requirements of essential industries, but for the next few months shipments from mills to warehouses may not be more than one-third those of March and April.

Of 2,200,000 tons of shell steel already allocated for 1918, shipments thus far amount to 1,500,000 tons. The year's orders on shell account are put at 5,000,000 tons.

This shell steel total is likely to leave as a by-product upward of 1,250,000 tons of relatively high-carbon material—the discard made arbitrarily as well as otherwise under the specifications. It is suggested that this should be utilized in some war products, as barb wire angle stakes, in spite of more difficult fabrication than with soft steel. Part of the discard accumulations at mills may be moved, though only now and then, in concrete reinforcing bars and in light rails under the subordinated classes of business.

It is not yet clear how steel companies whose rolling mills are less than 100 per cent on essential work can be turned to the help of other producers, as of plates and shell steel. There has been no stopping off short on less essential shipments, but the steps will be taken gradually.

Pig-iron producers at a meeting in Cleveland, May 3, mapped out a plan which will put that industry under as close direction as now exists in steel making. A survey of all blast furnace order books already started will be completed. A similar inquiry into the uses consumers of pig iron are making of the metal shipped will follow. Some adaptation of the zone system of coke shipments may be made to save long hauls, but there is pig iron and pig iron and this method has its limitations.

The allowing of the 3½ per cent commission to scrap dealers has been no stimulus to business. Large consumers are not willing to pay the commission and it remains to be seen how far competition will eliminate it.

Pittsburgh

PITTSBURGH, May 7—(*By Wire*).

The local steel trade has already adjusted itself completely to the new order of things by which, if needed, 100 per cent of the output of the blast furnaces, steel works and finishing plants will go to the Government until further notice, as a result of the pledges sent to Judge Gary, president of the American Iron and Steel Institute by, so far as known, every manufacturing plant in the Pittsburgh, Youngstown and Wheeling districts, this being in accordance with the action taken at the meeting of steel manufacturers held in New York on April 26. Plans are under way by which there will be a much better distribution of the

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	May 7 1918	Apr. 30 1918	Apr. 10 1918	May 9 1917
No. 2 X, Philadelphia	$34.25	$34.25	$34.25	$42.50
No. 2, Valley furnace	33.00	33.00	33.00	42.00
No. 2 Southern, Cincinnati	35.90	35.90	35.90	40.90
No. 2, Birmingham, Ala.	33.00	33.00	33.00	38.00
No. 2, furnace, Chicago*	33.00	33.00	33.00	42.00
Basic, deliv., eastern Pa.	32.75	32.75	32.75	38.00
Basic, Valley furnace	32.00	32.00	32.00	42.00
Bessemer, Pittsburgh	36.15	36.15	36.15	44.95
Malleable, Chicago*	33.50	33.50	33.50	42.00
Malleable, Valley	33.50	33.50	33.50	42.00
Gray forge, Pittsburgh	32.75	32.75	32.75	40.95
L. S. charcoal, Chicago	37.50	37.50	37.50	46.75
Rails, Billets, Etc., Per Gross Ton:				
Bess. rails, heavy, at mill	55.00	55.00	55.00	38.00
O.-h. rails, heavy, at mill	57.00	57.00	57.00	40.00
Bess. billets, Pittsburgh	47.50	47.50	47.50	80.00
O.-h. billets, Pittsburgh	47.50	47.50	47.50	80.00
O.-h. sheet bars, P'gh.	51.00	51.00	51.00	80.00
Forging billets, base, P'gh.	60.00	60.00	60.00	105.00
O.-h. billets, Philadelphia	50.50	50.50	50.50	75.00
Wire rods, Pittsburgh	57.00	57.00	57.00	85.00
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	3.685	3.685	3.685	4.159
Iron bars, Pittsburgh	3.50	3.50	3.50	3.75
Iron bars, Chicago	3.50	3.50	3.50	3.25
Steel bars, Pittsburgh	2.90	2.90	2.90	4.00
Steel bars, New York	3.095	3.095	3.095	4.169
Tank plates, Pittsburgh	3.25	3.25	3.25	6.50
Tank plates, New York	3.445	3.445	3.445	6.669
Beams, etc., Pittsburgh	3.00	3.00	3.00	4.00
Beams, etc., New York	3.195	3.195	3.195	4.419
Skelp, grooved steel, P'gh.	2.90	2.90	2.90	3.50
Skelp, sheared steel, P'gh.	3.25	3.25	3.25	5.50
Steel hoops, Pittsburgh	3.50	3.50	3.50	4.25

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	May 7 1918 Cents	Apr. 30 1918 Cents	Apr. 10 1918 Cents	May 9 1917 Cents
Sheets, black, No. 28, P'gh.	5.00	5.00	5.00	6.50
Sheets, galv., No. 28, P'gh.	6.25	6.25	6.25	8.00
Wire nails, Pittsburgh	3.50	3.50	3.50	3.50
Cut nails, Pittsburgh	4.00	4.00	4.00	3.75
Fence wire, base, P'gh.	3.25	3.25	3.25	3.45
Barb wire, galv., P'gh.	4.35	4.35	4.35	4.35
Old Material, Per Gross Ton:				
Carwheels, Chicago	29.00	29.00	29.00	24.25
Carwheels, Philadelphia	29.00	29.00	29.00	27.00
Heavy steel scrap, P'gh.	28.50	28.50	28.50	28.00
Heavy steel scrap, Phila.	29.00	29.00	28.00	25.00
Heavy steel scrap, Ch'go.	28.50	28.50	29.00	27.00
No. 1 cast, Pittsburgh	28.50	28.50	29.00	24.00
No. 1 cast, Philadelphia	29.00	29.00	29.00	28.00
No. 1 cast, Ch'go, net ton	27.00	27.00	27.50	21.50
No. 1 RR. wrot., Phila.	34.00	34.00	34.00	41.00
No. 1 RR. wrot., Ch'go, net	29.75	29.75	30.36	31.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$6.00	$6.00	$6.00	$7.50
Furnace coke, future	6.00	6.00	6.00	7.50
Foundry coke, prompt	7.00	7.00	7.00	8.50
Foundry coke, future	7.00	7.00	7.00	9.00
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	23.50	23.50	23.50	31.00
Electrolytic copper, N. Y.	23.50	23.50	23.50	31.00
Spelter, St. Louis	7.12½	6.75	6.75	9.12½
Spelter, New York	6.62½	7.00	7.00	9.37½
Lead, St. Louis	6.42½	6.62½	6.90	10.25
Lead, New York	6.62½	6.85	7.00	10.45
Tin, New York	41.05	95.00	85.00	59.37½
Antimony (Asiatic), N. Y.	13.00	13.00	12.75	25.00
Tin plate, 100-lb. box, P'gh.	$7.75	$7.75	$7.75	$8.50

output of pig iron, semi-finished steel and finished steel products, and one that will insure to the Government the very quickest deliveries and in maximum quantities of these materials. To-day (Tuesday) a meeting of the National Association of Sheet and Tin Plate Manufacturers is being held in this city, and the main subject to be discussed will be as to how the sheet and tin-plate mills can assure to the Government, if necessary, 100 per cent of the output of sheets and tin plate, and make deliveries in the shortest possible time. On Friday, May 3, there was a meeting of the Sub-Committee on Pig Iron, Iron Ore and Lake Transportation held in Cleveland, and it developed that practically a complete survey of all the blast furnaces in the American Pig Iron Association had already been made, this survey showing the actual quantities of pig iron sold by the furnaces from May to December, inclusive, the destination of this iron, the kind of iron each furnace is making, how much any furnace may have bought from other furnaces to apply on its contracts, and other detailed information. A survey will now be made of the concerns to whom the iron is being shipped, and they will be asked to fill out forms showing how much iron is due them from the furnaces that supply them, also the kind of iron deliveries called for in the contracts, and the uses to which the iron is being put. If, for example, a consumer of pig iron is found who is using only 60 per cent in the manufacture of steel castings or other war essentials, a report will be made that probably 40 per cent of the iron being shipped to this particular customer can be sent to some other consumer making war essentials, who is not getting enough iron to meet his demands. The idea is to have the most complete survey possible of how much pig iron can be made from May to December, inclusive, how to allocate it in the shortest possible time to the nearest consumers who are working on Government contracts and to insure to the Government the very best distribution of the output of pig iron. It is believed that by doing this much of shortage in pig iron reported will be relieved, so far as Government needs are concerned, as it is very evident to the Sub-Committee on Pig Iron, Iron Ore and Lake Transportation, that a good deal of iron is going to companies not actively engaged in making war essentials, and shipments of pig iron to them will likely be cut in a very short time. The desire of the pig iron and steel trades is to carry out faithfully its pledges of 100 per cent output for Government needs, all commercial business to be subordinated until Government needs are absolutely met. Other lines in the steel trade are making plans to meet the Government needs for their products.

The 15 per cent advance in wages of blast furnaces and steel works labor that went into effect recently seems to have spurred up the men, and some records for output were made by some blast furnaces and steel works in April. The amount of commercial business being placed in pig iron, semi-finished steel and finished steel products is very small, and is steadily growing less. Most of the steel companies are turning down orders every day on nearly all lines of finished steel.

Careful inquiry shows that stocks of finished steel goods held by jobbers and consumers are extremely light, probably lighter now than at any time since the war started in 1914. For some months past there has been no incentive for jobbers to stock up on steel products, as prices were fixed for some months, and it has been simply a question of getting deliveries from the mills. Present conditions by which 100 per cent of output is to go to the Government until further notice will work a great hardship to jobbers all over the country, as most of the steel companies will refuse to fill any orders from jobbers unless they can show priority certificates, showing that the material is intended to go into the manufacture of war essentials. Consumers, too, not engaged in making war products, are likely to find their supply of steel cut off any day, and they may be compelled to close down in the near future. So far as known, no manufacturing plants in the Pittsburgh district are actually closed at this

writing for lack of steel, but they are not getting any new supply, and when their stock is worked up they will be in distress for steel and will likely have to close. Some of the steel manufacturers will take care of old customers to the extent that if the Government does not take 100 per cent of their output they will give what may be available to consumers for whom they have been for some years regular sources of supply.

Pig Iron.—The local branch of the Ordnance Department is inquiring for 700 tons of Bessemer iron for shipment to a Braddock, Pa., concern that is making war materials for the Government, but up to this writing has not been able to get the iron, and it may have to be commandeered. A local interest has sold 1000 tons of Bessemer iron for prompt delivery to a company making ordnance for the Government, at the regular price of $35.20 Valley furnace. There is an insistent demand for Bessemer and basic iron and also to some extent for foundry iron, with practically none to be had. The output of pig iron in the Pittsburgh district is at a heavier rate now than at any time for some months, and this is also true of the Youngstown, Ohio, district. In the latter the entire 26 blast furnaces are now in operation. On May 1 the Carnegie Steel Co. was operating 52 out of 59 blast furnaces, and expects to start one or two more this week. This is the best record this company has made in furnace operations for more than a year. Consumers are very insistent for deliveries of pig iron on contracts, and are melting the iron as fast as it is received. Stocks at furnaces and in mill yards are very light, and will be as long as present conditions last. Some concerns melting pig iron for not strictly war essentials are very likely to find their shipments greatly curtailed or entirely shut off in the very near future.

Basic pig iron, $32; Bessemer, $35.20; gray forge, $32; No. 2 foundry, $33; No. 3 foundry, $32.50, and malleable, $33.50, all per gross ton at Valley furnace, the freight rate for delivery in the Cleveland and Pittsburgh districts being 95c. per ton.

Billets and Sheet Bars.—Sheet and tin plate mills and other consumers of billets and sheet bars that may not be receiving enough steel to meet their needs find it absolutely impossible to buy any steel in the open market. All the manufacturers have pledged 100 per cent of their output for Government use in plants making war essentials, and this includes sheet and tin plate mills. It is probable that some companies will have their supply of steel cut off in the very near future unless they can show priority certificate for the steel from the Government. As noted last week, the output of semi-finished steel is now running close to 3,000,000 tons per month, and it is not believed the Government can use this large quantity for any considerable length of time. It is expected that by July 1 the supply of steel for plants not making strictly war essentials will be easier than it is now. Two or three large steel companies whose melting capacity is larger than their rolling capacity are shipping steel ingots to other plants that have sufficient rolling capacity to take care of more steel than their open-hearth furnaces produce. So far, all Government requirements for steel have been for open-hearth, but this is growing so scarce that Bessemer steel is commencing to be used more and more in the manufacture of products that heretofore have been made only from open-hearth. A notable example is sanitary cans, which are now being made largely from Bessemer steel.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $47.50, sheet bars $51, forging ingots $73, and forging billets $60 base, all f.o.b. at mill, Pittsburgh or Youngstown.

Steel Rails.—Some heavy orders for standard section rails are expected to be placed by the Government in the very near future and owing to the scarcity of open-hearth steel, it is not improbable that some of these rails will be rolled from Bessemer stock. However rail mills are sold up for months ahead, and in order to get early deliveries on any new orders, it will be necessary for the rail mills to postpone deliveries on contracts made months ago by the railroads themselves. There is a feeling that perhaps the Government may late in June fix maximum prices on standard sections, but nothing official on this has been given out. There is a continued active demand for light rails from the lumber and coal interests, and the mills rolling light rails, and also the rerolling mills are sold up for months. The Government price on 25-lb. to 45-lb. sections is $3.00 per 100 lb. f.o.b. Pittsburgh, but it is said some small orders for standard sections rolled from Bessemer stock have brought as high as $63, and from open-hearth stock as high as $67 at mill.

Ferroalloys.—The local demand for ferroalloys, notably ferromanganese, is not very active, and it is believed consumers are covered for their needs for practically the remainder of this year. Some time ago, concerns making war essentials were quite uneasy about their supply of ferromanganese for last half of the year, and they covered their needs for this period. The supply of 50 per cent ferrosilicon seems to be better, and prices are slightly easier. We quote 70 per cent ferromanganese at $250 per gross ton at furnace, the seller absorbing the freight on which the consumer pays the Government tax of 3 per cent. For each unit over 70 per cent, producers of ferromanganese are asking about $4, which would make the price of 80 per cent, $290 at furnace. We quote 50 per cent ferrosilicon at $165 to $170 for last half of the year delivery, and for prompt shipments $170 to $175 is quoted. There is a fairly active demand for spiegeleisen and we quote 16 to 18 per cent at $65 to $75 at furnace, the seller usually allowing the freight. Some considerable sales of 10 and 11 per cent Bessemer ferrosilicon have been made for the year delivery, and at full prices as given below.

We now quote 9 per cent Bessemer ferrosilicon at $54, 10 per cent, $55; 11 per cent, $58.30; 12 per cent, $61.60. We quote 6 per cent silvery iron, $40; 7 per cent, $42; 8 per cent, $44.50; 9 per cent, $47; 10 per cent, $50. Three dollars per gross ton advance for each 1 per cent silicon for 11 per cent and over. All the above prices are f.o.b. maker's furnace, Jackson or New Straitsville, Ohio, these furnaces having a uniform freight rate of $2 per gross ton, for delivery in the Pittsburgh district.

Structural Material.—Local fabricators report that 90 per cent or more of their output of fabricated steel is for Government work, either on direct or indirect orders. Only an occasional small commercial job is placed. The McClintic-Marshall Co. has taken 700 tons for extensions to buildings for the Newport Rolling Mill Co. at Newport, Ky., and about 150 tons for the same purpose for the Apollo Steel Co., at Apollo, Pa. Deliveries of plain material by the mills are reported a little better. We quote beams and channels up to 15 in. at 3c. Pittsburgh.

Plates.—In the total order for Government cars are 15,000 50-ton composite gondola coal cars and 19,000 55-ton hopper coal cars. These are to be pushed as fast as possible in order to have them in early service to relieve expected car shortage next winter. The allotments of plates, shapes and bars for the building of all of these cars are now being worked out, and will go to the steel mills in a very short time. All local plate mills have pledged 100 per cent of their output to the Government if needed and until further notice, so that any consumers of plates that have not been making strictly war essentials will likely have their supply cut off entirely, or partly so, in a very short time. The output of the Carnegie Steel Co., at all its plate mills in April, was close to 125,000 tons, every pound of which went to the Government. We quote ¼-in. and heavier sheared plates at 3.25c. at mill, Pittsburgh.

Iron and Steel Bars.—All local mills rolling iron and steel bars have pledged 100 per cent of their output to the Government as long as it is needed. The market is very firm on iron bars on the 3.50c. basis, Pittsburgh. It is now impossible to get Government permits for export shipment of iron bars and mills are not quoting on export inquiries. The entire output of the iron and steel-bar mills for the remainder of this year is pretty well under contract. Prices are now very firm and we quote steel bars rolled from billets, 2.90c.; from old steel rails, 3c., and refined iron bars, 3.50c. at mill, Pittsburgh.

Sheets.—A meeting of the National Association of Sheet and Tin Plate Manufacturers was held here to-

day (Tuesday) but only routine business was transacted. The independent sheet mills operated in April to a general average to about 75 per cent, but operations so far in May have been at a less rate, owing to the growing shortage in supply of steel. Mills that run short of sheet bars report they are unable to get any in the open market, and the shortage in steel is curtailing output of sheets to a very great extent. The sheet mills have pledged to the Government 100 per cent of their limited output if needed, but so far there has been a fairly large quantity of sheets available for commercial customers and for jobbers. However, under the new order of things, sheet mills will require a priority certificate from customers not rolling war essentials, but just what action is to be taken as regards jobbers has not yet been determined. This is one of the questions that is to be worked out by the sheet mills in the near future. It is probable some plants not making strictly war essentials may have their supply of sheets cut off in the near future, should the Government find it is able to use all of the present limited output. Prices fixed by the Government on sheets in effect until June 30, are given on page 1247.

Tin Plate.—In spite of the shortage in the supply of steel, the tin plate mills are still operating to 95 per cent or more of capacity, and expect to continue to do so right along. The tin plate makers expect to be able to supply all the material needed for the manufacture of pure food containers, and for other Government purposes, and in addition to send probably 5,000,000 boxes of tin plate to France, which they early in the year agreed to do. The mills are not quoting on export inquiries, as under present conditions, it would probably be impossible to secure export permits from the Government. There are still a few consumers who have not covered their needs for last half of the year, but they have verbal promises from their sources of supply that they will be taken care of. The output of tin plate for this year is expected to break all previous records. We quote tin plate at $7.75 per base box, up to June 30, and rolled from Bessemer or open-hearth steel, f.o.b. Pittsburgh. Prices on terne plate, for which the demand is very quiet, owing to the dull conditions in building trade, are given on page 1247.

Cotton Ties.—Consumers are covered for this month and June, but no sales have yet been made for delivery starting July, and will not be until Government prices on steel have been fixed for third quarter.

We quote cotton ties at $1.90 per bundle of 45 lb. for lots of 3000 bundles and over. For lots of 1000 bundles and up to, but not including, 3000 bundles, $1.92 per bundle, f.o.b. Pittsburgh. These prices are for April shipment, while for May 1c. additional carrying charge is made, and 2c. for June.

Wire Rods.—There are no rods for the open market for sale in this district, but occasionally a request comes from the Government that certain orders be filled, the rods to be used in making war essentials, and in these cases the mills take the orders and turn them out as fast as possible. The output of rods is very much restricted, owing to the shortage in steel, one local mill running at only about 40 per cent, and another at about 50 per cent of capacity. There are some export inquiries for rods, but mills are not quoting on these, as under present conditions export licenses from the Government could not be secured. Prices on wire rods, in effect until June 30, are given on page 1247.

Wire Products.—The order for 49,000 kegs of wire nails for the Quartermaster's Division at New York, bids for which were opened on May 3, has all been placed with the Pittsburgh Steel Co. of this city. Deliveries are to be in equal quantities on May 15, June 15 and July 15, and if it desires, the Government has the privilege of calling for an equal quantity of nails in each month, starting with August. On the other hand, the Pittsburgh Steel Co. has the privilege of cancelling any further quantity other than the 49,000 kegs if notice is given to the Government on or before May 15. The order for 47,000 kegs of wire nails for the Army, bids for which were opened on April 27, has not yet been given out. The output of wire nails is not running over 40 to 50 per cent of capacity, owing to the shortage in steel, and the mills expect that the Government will take all of this limited output up to July 1, or possibly longer. Local mills say they are turning nice orders from their regular trade nearly every day, desiring to conserve all the wire nails and wire they are making for the Government, and will do so as long as their product is needed. Reports received by the mills show that stocks of wire and wire nails all over the country are very light, and jobbers who send in orders for nails or wire will have to furnish a priority certificate before the mills will acept them. The commercial demand for wire and wire nails for some time has been fairly active, but the mills were not making contracts with their customers, as there was no incentive to do so. Local mills say they have specifications in hand for practically all the wire and wire nails still due their customers, and that these will be shipped as fast as possible. The Government price on cut nails is $4 base, per keg, in carload lots, f.o.b. Pittsburgh. Prices on wire and wire nails are given on page 1247.

Hot-Rolled Strip Steel.—The new demand is quiet, and makers of hot-rolled strip steel are not operating their plants to more than 50 per cent of capacity due to lack of orders and shortage in supply of steel. As stated before, it is probable that some makers of hot-rolled strip steel will engage in making new products that are essential to the war. The Government maximum price is $4.50 per 100 lb. f.o.b. Pittsburgh for second quarter.

Cold-Rolled Strip Steel.—Mills are not running to more than 60 to 75 per cent of capacity, due to lack of orders and shortage in supply of steel and several makers of cold-rolled strip steel state they are operating to only about 50 per cent. The Government is buying fairly large quantities for use in this country, but export business is very dull. Stocks piled in warehouses have been pretty well moved out, as the supply of cars is now nearly normal. It is said that Government prices are being very firmly held.

We quote cold-rolled strip steel at $6.50 per 100 lb., f.o.b. Pittsburgh, terms 30 days, less 2 per cent cash in 10 days, when sold in quantities of 300 lb. or more.

Shafting.—For some months 85 to 90 per cent of the output of shafting has been going to the Government on direct or indirect orders and under the pledges given recently by the manufacturers, 100 per cent of the output will go to the Government, if it is needed. The demand for shafting from the screw stock machine trade, and also from builders of pleasure cars has been very dull for some time and is getting less. Government discounts on shafting are 17 per cent off in carloads and 12 per cent off in less than carloads, at mill, Pittsburgh.

Nuts and Bolts.—Manufacturers of nuts and bolts now state very strongly that any weakness in prices has entirely disappeared and that full discounts are being observed as fixed by the Government and in effect for this quarter. Practically 100 per cent of the limited output of nuts and bolts is now going to the Government on direct or indirect orders. Output is restricted to some extent on account of the shortage in supply of steel. Discounts on nuts and bolts for this quarter as fixed by the Government are given on page 1247.

Rivets.—Practically 100 per cent of the output of rivets is now going to the Government on direct or indirect orders. The commercial demand for some time has been very dull, and it is stated stocks held by jobbers and consumers are very light. Government prices for second quarter are $4.65 for structural rivets, and $4.75 for cone-head boiler rivets, per 100 lb., f.o.b. Pittsburgh.

Skelp.—The output of iron and steel skelp for practically the remainder of this year is under contract, prices on sales made for delivery starting in July being left open, and to be whatever prices the Government may fix.

We quote grooved skelp at $2.90; universal skelp, $3.15; and sheared skelp, $3.25 base. Special skelp for boiler tubes, etc., is $3.40 for base sizes and $3.55 for other sizes, all prices being per 100 lb., f.o.b. Pittsburgh.

Wrought Pipe.—The Government is a fairly heavy buyer of iron and steel pipe for new work under way in this country, while part of its purchases are being shipped to England and France. Some Government oil lines are also being laid, which are requiring very large

quantities of 8-in. pipe, and which is being furnished by local mills. The output of both iron and steel pipe for the remainder of this year is practically all under contract. On the small sizes of butt-weld pipe, home mills can make delivery in from 60 to 90 days from date of order. Discounts on iron and steel pipe are given on page 1247.

Hoops and Bands.—Mills report a very active demand for both hoops and bands, the demand for narrow sizes of hoops being especially heavy. These are being used in large quantities on rosin oil barrels and turpentine barrels, immense quantities of which are being purchased by the Government. Prices on steel hoops for cooperage purposes are $3.50 and steel bands $2.90 per 100 lbs., extras on the latter as per the steel bar card, f.o.b. Pittsburgh.

Boiler Tubes.—The program of the Government for the building of locomotives, contracts for most of which have been placed with the American Locomotive Co. and the Baldwin Locomotive Works, will require many thousands of tons of iron and steel tubes, and delays in delivery of these are likely, as the tube mills are filled up now for practically all the material they can roll over the remainder of this year. The demand for oil country goods is very heavy, the development of new oil fields being active in order to increase the output of fuel oils to be used as much as possible in place of coal. Discounts on iron and steel tubes for this quarter are given on page 1247.

Old Material.—The fact that the War Industries Board has agreed to allow 3½ per cent commission to dealers who secure scrap for consumers has not yet resulted in any material increase in the amount of new business being done in scrap. However, local dealers believe sales will soon show an increase, as all local consumers are running very short of scrap, and are expected to be active buyers very soon. Reports are that the leading interest has bought or will buy this week a very large tonnage in heavy steel scrap for open-hearth purposes, but this is not confirmed. The quantity involved is said to be between 25,000 and 30,000 tons, and it is likely it will be closed before this week ends.

Heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh, delivered	$28.50 to $29.00
No. 1 cast scrap (for steel plants)	28.50 to 29.00
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., Franklin, Pa., and Pittsburgh	33.00 to 34.00
Hydraulic compressed steel scrap	26.00 to 27.00
Bundled sheet scrap, sides and ends, f.o.b. consumers' mills, Pittsburgh district	24.00 to 25.00
Bundled sheet stamping scrap	22.00 to 23.00
No. 1 railroad malleable scrap	28.00 to 29.00
Railroad grate bars	18.00 to 19.00
Low phosphorus melting stock (unguaranteed)	34.00
Low phosphorus melting stock (guaranteed)	36.50
Low phosphorus melting stock (bloom and billet ends, heavy plates)	39.00
Iron car axles	46.00 to 46.50
Locomotive axles, steel	46.00 to 46.50
Steel car axles	46.00 to 46.50
No. 1 busheling scrap	26.00 to 27.00
Machine shop turnings	18.00 to 19.00
Cast iron wheels	28.00 to 29.00
Rolled steel wheels	34.00 to 36.00
Sheet bar crop ends (at origin)	34.00 to 35.00
Cast iron borings	18.50 to 19.00
No. 1 railroad wrought scrap	33.00 to 34.00
Heavy steel axle turnings	23.00 to 24.00
Heavy breakable cast scrap	28.00 to 29.00

Coke.—The supply of cars last week averaged 70 to 75 per cent, and on Monday and Tuesday of this week was close to 100 per cent. There was very little complaint from coke operators about cars, while blast furnaces report they are now getting coke about as fast as they need it. Five or six blast furnaces in the Pittsburgh and Youngstown districts have recently been started, the outlook for supply of coke warranting this action. No contracts are being made for coke, all sales being billed at regular Government prices, which are $6 for 48-hr. blast furnace coke, $7 for 72-hr. foundry and $7.35 for crushed coke from 1-in. size, all in net tons at oven.

Chicago

CHICAGO, May 6.—(*By Wire.*)

Commercial consumers of steel are showing anxiety to get on the books of the producers for any delivery, some of them suggesting 1919, but their wishes are receiving no consideration, inasmuch as the mills are not looking that far ahead and for weeks to come will be running at capacity on plates and other products for the Government. The bar and sheet capacity is not entirely absorbed by war needs, but the production of sheets is only around 50 per cent in view of the diversion of sheet bars to tin plate mills and to other and more urgent needs. Where galvanized sheets are to house an essential industry they will be supplied, but not otherwise.

The leading independent is receiving actual specifications and shipping orders for about 22,000 tons of ship material distributed over several months. The Japanese ship plate requirements are a live issue and it is expected about half the total required will be released at an early date. It is reported that of the 2,200,000 tons of shell steel allocated for 1918 about 1,500,000 tons already has been shipped. In this connection there is a possibility that Western mills may be released from supplying shell steel which was to have been shipped to Canada for forging, arrangements for the forging not having been completed.

So far, there is no indication of any non-essential manufacturer being in distress through inability to get material. Some consumers of basic and malleable pig iron are anxiously looking for future supplies, but they are in a position to ask the Government to help them, if necessary. None of the gray iron foundries is in want, and it is probable that a survey would show all well covered with stock in their yards. The bolt and nut manufacturers are holding firmly to their prices, and telling customers they should be but little concerned over prices, inasmuch as when present supplies of raw materials are exhausted the bolt and nut makers may be able to run only 50 per cent.

The position of jobbers in iron and steel is a moot subject. Their stocks are dwindling and they see but little prospect of getting more under existing conditions. A representative of a prominent house asserts that the jobbing business is an index of the mill business and that it performs an important function in caring for the small Government contractor or subcontractors. Mill representatives admit they send these small buyers to warehouses, and are disposed to care for the jobbers if permitted to do so. They cannot change their rolling schedules to get out a small tonnage and continue to maintain 100 per cent for the Government. One mill communicated with Washington on the subject and was instructed that all jobbers must receive the same treatment regardless of their size. In arguing that warehouse stocks should be maintained, the jobbing representative referred to said his company had helped out the Shipping Board by replacing defective material and supplying shortage, small lots being hurriedly required. At one of his plants, 50 per cent of the business was for direct Government requirements and the other 50 per cent nearly all indirect. Months ago his firm had inaugurated a plan of serving no one who would not state the purpose for which the material was wanted, and since the recent pledge the rule was more strictly adhered to and Government needs given precedence. It is emphasized that warehouse customers want their material in a hurry and usually cannot wait two or three weeks for a priority order. The average warehouse sale is less than one ton. A Pacific Coast mill which has been wrestling with the question is inclined to let the jobbers fight their own battle and endeavor to effect some arrangements whereby the War Industries Board will let them sell to essential manufacturers from stocks they may be authorized to carry. The situation is one which probably will be adjusted in the next few weeks. Meanwhile warehouse stocks are steadily being reduced.

Pig Iron.—It cannot be said that any consumers are in actual distress because of a lack of pig iron, but

some using basic and malleable are becoming anxious, to say the least. Many inquiries for these grades are before the trade and apparently have but little chance of being satisfied, unless the Government takes a hand and directs that the requirements be filled, action which probably will eventuate. Among those wanting basic is a large steel casting company, while malleable is being sought by foundries which expect to make parts for Government freight cars. When certain surveys are completed, it probably will be found that the gray iron foundries have surprisingly large stocks in their yards. For foundry iron there is no widespread inquiry, but any offerings are quickly taken, and the sellers are moving all they can get. Most of the available iron is No. 3 or even a lower grade, some being of a character that cannot be used in this vicinity. About 800 tons of silvery for May and June delivery was snapped up when offered. It would help to solve the existing problem if additional furnaces should go on basic, but this they are hardly likely to do while they can sell all the foundry they can make at a higher price than basic commands.

The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic irons, which are f.o.b. furnace, and do not include a switching charge averaging 50c. per ton:

Lake Superior charcoal, Nos. 2 to 5	$37.50
Lake Superior charcoal, No. 6 and Scotch	40.00
Northern coke foundry, No. 1	33.50
Northern coke foundry, No. 2	33.00
Northern coke foundry, No. 3	32.50
Northern high-phosphorus foundry	33.00
Southern coke No. 1 foundry and No. 1 soft	38.50
Southern coke No. 2 foundry	37.00
Malleable	33.50
Basic	32.00
Low phosphorus (copper free)	53.00
Silvery, 7 per cent	44.54

Ferroalloys.—There is a better demand for spiegeleisen, the price of which, 16 to 18 per cent, is $70, furnace. Seventy per cent ferromanganese is quiet at $255, delivered. Bessemer ferrosilicon is in good demand, with but little to be had. Local consumers are inquiring for 2300 tons of 10 to 12 per cent.

Plates.—The mills are working to capacity, and all for the Government. On the Japanese plate requirements, the subject of recent negotiations, some action is looked for soon, it being expected that one-half of the total tonnage will be released. Unquestionably the plate situation is acute. Jobbers' stocks are much depleted. They quote 4.45c. The official mill quotation is 3.25c.

Bars.—There is less demand from the Government for bars than for plates and shapes, but the Government nevertheless is taking a goodly tonnage. Bar iron is a little more active and is expected to become more so when specifications for Government cars appear. Concrete reinforcing bars are quiet. We quote bars of discard shell steel at 3.02½c., Chicago; iron bars at 3.50c, Chicago; mild steel at 2.90c., Pittsburgh or Chicago, and rail carbon at 3c., Chicago. Jobbers quote:

Soft steel bars, 4.10c.; bar iron, 4.10c.; reinforcing bars, 4.10c., base, with 5c. extra for twisting sizes ½ in. and over and usual card extras for smaller sizes; shafting, list plus 10 per cent.

Sheets.—A meeting of the sheet interests is being held in Pittsburgh this week. This is one of the few lines in which production has been restricted heavily for want of steel, the Government's requirements being less proportionately than in some other products. The local mills have nothing to sell. We quote No. 28 black sheets at 5c., No. 28 galvanized at 6.25c., and No. 10 blue annealed at 4.25c., all Pittsburgh.

We quote for Chicago delivery out of stock, regardless of quantity, as follows: No. 10 blue annealed, 5.45c.; No. 28 black, 6.45c., and No. 28 galvanized, 7.70c.

Structural Material.—A few tentative inquiries for car material have appeared as a result of the Government's placing of cars, and specifications are expected to follow soon, it being understood that Washington will allocate the orders. The McClintic-Marshall Co. will fabricate 1187 tons to erect a gray iron foundry for the tractor works of the International Harvester Co., Chicago, and the American Bridge Company will supply to the Illinois Steel Company, Gary, two sulphuric acid tanks requiring 134 tons. The mill quotation is 3c., Chicago or Pittsburgh, and for warehouse material jobbers ask 4.25c.

Wire Products.—Production is satisfactory. The heaviest demand is for barbed wire, although the Government also is taking a heavy tonnage of nails. We quote:

Nails, $3.50, Pittsburgh; plain fence wire, $3.25; painted barb wire, $3.65; galvanized barb wire, $4.35; polished staples, $3.65, and galvanized staples, $4.35.

Bolts and Nuts.—The volume of orders is increasing and prices are firm. The manufacturers are informing their customers that price should be a matter of but little concern in view of their expectation that when present stocks are exhausted they do not anticipate getting more material than will enable them to run over 50 per cent of capacity. In selling they are proceeding cautiously. For prices and freight rates see finished iron and steel, f.o.b., Pittsburgh, page 1247. Jobbers quote:

Structural rivets, 5.50c.; boiler rivets, 5.60c.; machine bolts up to ⅝ x 4 in., 40 and 10 per cent off; larger sizes, 35 and 5 off; carriage bolts up to ⅝ x 6 in., 40 and 2½ off; larger sizes, 30 and 5 off; hot pressed nuts, square tapped, $1.05 off, and hexagon tapped, 85c. off per 100 lb.; coach or lag screws, gimlet points, square heads, 50 per cent off.

Old Material.—There is a good demand for steel and malleable scrap and little or none for cast and rolling mill grades. On the whole, the market is quiet, few re-rolling rails are coming out, a continued bad feature for the makers of high carbon bars and shapes. Naturally the dealers are pleased with the ruling allowing them a commission of 3½ per cent. Changes in methods of doing business are being made frequently these days. The Northwestern has requested that all prices be submitted on a gross ton basis, presumably to facilitate comparison with Government maximums. The Pennsylvania Railroad requests that all bids submitted to it be made f.o.b. consuming point when that point is located on their lines. If on another road, the consuming point should be shown together with the freight rate from the f.o.b. point. The arrangement is a precaution against the exceeding of fixed maximums by delivered prices. Small lists have been issued by the Pennsylvania, Great Northern, Union Pacific, Northern Pacific and Pere Marquette.

We quote for delivery in buyers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton	
Old iron rails	$38.00 to	$39.00
Relaying rails		60.00
Old carwheels		29.00
Old steel rails, rerolling		34.00
Old steel rails, less than 3 ft		34.00
Heavy melting steel	28.50 to	29.00
Frogs, switches and guards, cut apart		29.00
Shoveling steel	27.75 to	28.25
Steel axle turnings	21.50 to	22.50
	Per Net Ton	
Iron angles and splice bars		$34.21
Iron arch bars and transoms	39.50 to	40.50
Steel angle bars	30.00 to	31.00
Iron car axles		41.52
Steel car axles		41.52
No. 1 railroad wrought	29.75 to	30.36
No. 2 railroad wrought	28.00 to	28.50
Cut forge	28.00 to	28.50
Pipes and flues	23.00 to	23.50
No. 1 busheling	25.75 to	26.25
No. 2 busheling	17.50 to	18.00
Steel knuckles and couplers		30.36
Coil springs		30.36
No. 1 boilers, cut to sheets and rings	21.00 to	22.00
Boiler punchings	32.00 to	33.00
Locomotive tires, smooth	37.00 to	38.00
Machine-shop turnings	15.50 to	16.00
Cast borings	15.50 to	16.00
No. 1 cast scrap	27.00 to	27.25
Stove plate and light cast scrap	22.25 to	22.75
Grate bars	22.00 to	23.00
Brake shoes	23.00 to	24.00
Railroad malleable	29.00 to	29.50
Agricultural malleable	27.50 to	28.50
Country mixed scrap	19.50 to	20.00

Rails and Track Supplies.—Some of the mills in this vicinity are loaded up with rivets but still have capacity for track bolts and spikes. There is, however, no great demand for the two latter. We quote:

Standard railroad spikes, 4.11½c., Chicago. Track bolts, with square nuts, 5.11½c., Chicago. Tie plates, steel, 3.25c.; tie plates, iron, 3.75c.; f.o.b. maker's mill. The base for light

rails is 3c., f.o.b. maker's mill for 25 to 45-lb. sections, lighter sections taking Government extras.

Cast Iron Pipe.—Madison, Wis., has confirmed a recent award of 200 tons to the Central Foundry Co., which will furnish universal pipe. The same company also has received an order for 140 tons from Marinesco, Mich. No business is reported in other directions.

Quotations per net ton, Chicago, are as follows: Water pipe, 4-in., $57.30; 6-in. and larger, $54.30, with $1 extra for Class A water pipe and gas pipe.

Philadelphia

PHILADELPHIA, May 7.

Steel companies of this district have notified their customers that to procure shipments of steel they must produce priority certificates from Washington. This action has been taken even when it is known that the consumer is engaged 100 per cent on war work. As long as may be required by the War Industries Board, the steel companies will give 100 per cent of their output of tested material to the Government or to companies which can obtain priority orders. Even the odds and ends which go to the stockyard will be offered to the Government and only if they cannot be applied to war work will such material be sold to the commercial trade. Some mills will in all probability continue to sell discard steel and material which fails to pass Government inspection. Discard steel has been rolled into light rails, sheets and bars, but it may now be difficult for the commercial trade to obtain rollings to suit their requirements, as rolling mills may not have openings in their schedules for such non-war work. Some of the steel makers believe that the 100 per cent pledge to the Government will not greatly alter conditions for the commercial trade, while others believe that consumers not on war work will find it difficult to get even sufficient discard or rejected steel for their needs. An Eastern mill last week shipped 84 per cent of its output for Government work, and the remaining 16 per cent, which consisted of material which could not be applied to Government work, went to commercial users. Pig iron business is almost at a standstill, sellers declining to consider orders under present conditions. It seems probable that more drastic methods of apportionment of iron, particularly steel-making iron, among mills on important work will soon be put into effect. The trade is expecting further regulation which will divert iron into the channels where it is most needed. At present there is a serious shortage of basic iron in eastern Pennsylvania and a considerable tonnage of Alabama iron will be brought here on Government order. The granting of the right to consumers of scrap to pay dealers and brokers a buying commission of 3½ per cent has not as yet stimulated trading in scrap in this market.

Pig Iron.—A serious shortage of basic pig iron is being felt by Eastern consumers. The output in this district is not sufficient to keep plate and shape mills fully supplied, and in one instance the Government has had to "borrow" iron from one plant for the benefit of another located at a nearby point. A considerable tonnage of basic is to be brought here from Woodward, Ala., for the benefit of the Lukens Steel Co., whose supply was almost at the point of exhaustion. An Eastern furnace has also been ordered to ship its entire output for the time being to this plant. The new Lukens plate mill is almost ready for operation, and much more iron will be required than is now being received. The Penn Seaboard Steel Corporation plate mill at New Castle, Del., will start operating about July 1 and the Worth Steel Co. plant at Claymont, Del., will also be ready about that date or soon thereafter. The Penn Seaboard plant has converted five of its 15 open-hearth furnaces from acid to basic, to prepare for plate production. Some method will have to be found by the Government to supply enough basic iron to keep these new plate mills in operation. No iron is being sold, but orders are continually being received from Washington allocating iron to manufacturing plants on war work. The sellers here fully expect that the Government will find a method of exercising a more thorough control of iron shipments, particularly steel-making iron. The regulations as to foundry iron shipments are not so strict as with steel-making iron, but more complete control is apt to come also for foundry grades. The Navy Department has allocated 2400 tons of foundry iron to Virginia furnaces for shipment in this quarter and second half.

Eastern Pennsylvania No. 1 X	$34.50
Eastern Pennsylvania No. 2 X	33.50
Eastern Pennsylvania No. 2 foundry	33.00
Virginia No. 2 X (including freight)	36.77
Virginia No. 2 foundry (including freight)	36.27
Basic	32.00
Gray forge	32.00
Bessemer	35.20
Standard low phosphorus	53.00
Low phosphorus (copper bearing)	50.00

Ferroalloys.—Pending the announcement of the result of the meeting in Pittsburgh to-day (Tuesday) of the Sub-Committee on Ferroalloys of the American Iron and Steel Institute with steel manufacturers, there will probably be little or no business done. Several large inquiries now before the producers will not be closed, it is expected, until a decision is definitely reached as to the 70 per cent standard for ferromanganese and the 16 per cent standard for spiegeleisen. Ferromanganese remains firm at $250, delivered, for the 70 per cent, with $4 added for each additional unit, while spiegeleisen shows greater strength. One seller is holding for $77.50, at furnace, for 2000 tons. Two carloads were sold last week for prompt delivery at $80, furnace. The supply of spiegeleisen is better than it was a few weeks ago, as one or two furnaces which were on ferromanganese have changed over to spiegeleisen.

Coke.—There is no material change in the coke situation. Some furnaces are still having difficulty in getting a sufficient supply. We quote 48-hr. furnace coke at $6 and 72-hr. foundry coke at $7, Connellsville ovens.

Rails.—General Pershing has cabled to the War Department for 100,000 tons of rails and it has been decided to ship the rails rolled for the Russian Government, which have been lying in storage at Eastern ports for about a year. There are 76,000 tons of these rails, which are 67½ lb. The remaining 24,000 tons will be rolled from Bessemer steel by an Eastern mill in 80-lb. sections for delivery during June, July and August, 8000 tons per month. It may be difficult for mills to fill orders for light rails, which have been rolled from discard steel, because of the pledge which requires 100 per cent operation on Government work. This means that the mills will be so filled with Government rail business and projectile steel, which is being rolled on rail mills, that light rails from discard steel may be sidetracked.

Billets and Slabs.—Mills which roll plates from slabs have received small Government orders and a sufficient tonnage of slabs to cover these orders has been allocated to them. Some of these mills have taken commercial orders freely, orders having been accepted at prices exceeding the Government maximum in numerous instances. Commercial orders now on their books will presumably not be filled, and they will concentrate exclusively on Government work. We quote open-hearth re-rolling billets, 4 x 4 in. and larger, at $50.50, Philadelphia.

Finished Iron and Steel.—Producers of plates, shapes, bars, etc., are devoting their entire attention to Government work and commercial orders are receiving no consideration whatsoever. Jobbers are considerably troubled as to how the Government pledge is going to affect their supplies. It seems probable that when shipyards and other war plants find the jobbers unable to supply their hurry-up orders, they will in some way make known to Washington their dependence on the jobber for many forms of steel which cannot be gotten from the mills without considerable delay. It is believed here that there is no intention to shut off the jobbers entirely from supplies, but that shipments to them will be greatly curtailed there seems no question. Some jobbers are accused of profiteering, but the majority, it is stated, have followed the Government maxi-

mum prices and to these consideration will undoubtedly be given by the War Industries Board. Plate mills, for the past few weeks, have been concentrating on plates for Hog Island. One company last month shipped 20,000 tons for that shipyard alone. This is nearly half of the total monthly requirements of the shipyard. Large orders for locomotive and car steel have been allocated to mills in this district. Local fabricators last week submitted bids on 3000 tons of structural steel for the warehouse at Boston to be built by the Government. We quote sheared plates, ¼ in. and heavier, at 3.25c.; plain material at 3c.; soft steel bars at 2.90c.; No. 10 blue annealed sheets, 4.25c.; No. 28 black sheets, 5c., and No. 28 galvanized sheets, 6.25c., Pittsburgh. Bar iron is quoted at 3.685c., Philadelphia.

Old Material.—Buying of iron and steel scrap has not been stimulated as yet by the announcement that the War Industries Board would permit the payment of a 3½ per cent buying commission by consumers to dealers and brokers. Dealers are asking $29 for heavy melting steel, plus the commission, but consumers are not sufficiently in need to pay $29 and the commission. Some of the large dealers are well sold up for the next two or three months, and they are endeavoring to find the scrap with which to fill their orders. The Sub-Committee on Iron and Steel Scrap of the American Iron and Steel Institute announces that it will take drastic action against violators of the Government maximum prices or the ruling of the War Industries Board that dealers or brokers must not split their buying commission with any other dealer, broker or producer. The commission must be shown as a separate charge in billing. Dealers who have been caught in violations of the maximum prices have been ordered by the sub-committee to re-bill the material, and more summary action will be taken if violations are repeated. The Railroad Administration, upon request of the Bureau of Inspection of the American Board of Scrap Dealers, has withdrawn all freight cars for 30 days from a scrap dealer who was found guilty of improper practices. At its next meeting the Sub-Committee on Iron and Steel Scrap will consider the request of certain Western foundries that the maximum price for No. 1 cast for foundry use be reduced. We quote as follows for delivery in the eastern Pennsylvania district:

No. 1 heavy melting steel	$29.00
Steel rails, rerolling	34.00
No. 1 low phosphorus heavy, 0.04 and under	39.00
Low phosphorus, 0.04 and under	36.50
Low phosphorus (not guaranteed)	$32.00 to 34.00
Old iron rails	39.00
Old carwheels	29.00
No. 1 railroad wrought	34.00
No. 1 yard wrought	33.00
Country yard wrought	29.00
No. 1 forge fire	26.00 to 27.00
Bundled skeleton	26.00 to 27.00
No. 1 busheling	31.00
No. 2 busheling	17.00 to 18.00
Turnings (for blast furnace use)	17.50 to 18.00
Machine shop turnings (for rolling mill use)	18.50 to 19.00
Cast borings (for blast furnace use)	17.50 to 18.00
Cast borings (clean)	19.00
No. 1 cast (for steel plant use)	29.00
No. 1 cast (cupola sizes)	32.00 to 33.00
Grate bars	23.00 to 24.00
Stove plate	24.00 to 25.00
Railroad malleable (for steel plants)	28.00 to 29.00
Railroad malleable (for malleable works)	31.00 to 32.00
Wrought iron and soft steel pipes and tubes (new specifications)	33.00
Ungraded pipe	29.00

Birmingham

BIRMINGHAM, ALA., May 6.

Pig Iron.—The general condition of the Birmingham iron market is illustrated by that of a large foundry iron producer, who puts it this way: "Our probable capacity for the remainder of the first half and the first four months of the second half is sold and we have a sprinkling of orders booked for the last two months of the year. We are practically out of the market, because we do not very well see how we can care for regular customers and take on new business. Furnaces are working well and the output of high silicon averages high. Our main trouble is at our mines and coking plants, where there is not only a shortage of men but also a shortage in the efficiency of men. The inquiry is brisk and we could book much more iron than we do. The Middle West is especially anxious to secure additional tonnage. Yard stocks are going down." The Trussville blast furnace, after years of idleness, resumed operations during the first week of May after having been overhauled by the Birmingham Trussville Iron Co., of which E. A. Shedd, Chicago, is president. Owing to the order of the Government forbidding the export of pig iron, the Talladega, Ala., blast furnace leased by Japanese interests, may not resume operations as scheduled. The second Gadsden stack of the Alabama Co. is now scheduled to blow in about June 1. The output of basic is still large, the Woodward Iron Co. having three stacks on basic and two on foundry and the Tennessee company being also extensively on foundry. We quote per gross ton, f.o.b. Birmingham district furnaces, as follows:

No. 2 foundry and soft	$33.00
Basic	32.00

Cast Iron Pipe.—Orders for Government plants of various kinds tend to keep water pipe plants now active at 50 per cent of capacity and there is some indication of betterment in other lines. Muscle Shoals contractors are taking 3000 to 4000 tons of various sizes.

Coal and Coke.—Alabama miners have accepted the wage agreement made through Fuel Administrator Garfield effective May 15 and binding for two years or until the end of the war. The advance is 45c. per ton, coal diggers getting 5c. and common labor proportionately more. Operators will be allowed to charge the added cost of operations. There are cars to move the output both of coal and coke, which is large.

Old Material.—The scrap market is described as a nip and tuck proposition with demand and supplies on yards in a proportion that estops changes in quotations. We quote, per gross ton, f.o.b., Birmingham yards, prices to consumers, as follows:

Old steel axles	$32.00 to $33.00
Old steel rails	27.00 to 27.50
Heavy melting steel	25.50 to 26.00
No. 1 railroad wrought	31.00 to 32.00
No. 1 cast	27.00 to 27.50
Old carwheels	28.00 to 29.00
Tramcar wheels	21.00 to 25.00
Machine shop turnings	15.00 to 16.00
Cast iron borings	15.00 to 16.00
Stove plate	23.00 to 24.00

St. Louis

ST. LOUIS, MO., May 6, 1918.

Pig Iron.—The announcement that the Government had practically, if not actually, commandeered pig iron supplies, the country over, put a stop in this market to the selling of pig iron of all characters for the time being, as representatives were unable to put through any transactions for even the small lots of surplus or off-analysis iron in which they have been able to deal to some extent during recent weeks. Up to the actual time of the announcement there had been some small selling of such lots, but these were not numerous. The market is now awaiting further developments, though the melters with Government orders on their books are taking the situation calmly, regarding it as certain that they will be taken care of in good time. Deliveries on material already under contract are the matter of chief concern at present with those melters not having Government orders, and they are endeavoring to ascertain as promptly as possible just where they stand. Shipments had begun to come in quite satisfactorily and now they feel "up in the air" again.

Coke.—No new business appeared in coke during the week, but the reports of improved deliveries were more numerous and a generally better feeling prevailed among those utilizing the fuel. No new supplies are available, and therefore no new business could be booked, though oven representatives are assuring old customers that every effort will be made to take care of their needs.

Finished Iron and Steel.—No particular interest at-

tached during the week to the finished product market, mill representatives continuing to act chiefly as traffic men to search out shipments due in for customers. No sales are being made, and inquiries continue to be listed for deferred consideration. Movement out of warehouse is still beyond the warehouse capacity to meet and delays in delivery are developing some troublesome characteristics. For stock out of warehouse, we quote as follows: Soft steel bars, 4.17c.; iron bars, 4.17c.; structural material, 4.27c.; tank plates, 4.52c.; No. 8 sheets, 5.47c.; No. 10 blue annealed sheets, 5.52c.; No. 2 black sheets, cold rolled, one pass, 6.52c.; No. 28 galvanized sheets, black sheet gage, 7.77c.

Old Material.—The announcement of the ruling on the matter of commissions on scrap developed only casual interest in this market because of the fact that at the present time the market is soft and is at a point where transactions can be carried on at a profit without the utilization of the commission feature. Dealers of the larger class, however, have agreed that there will be no attempt to evade the regulation about splitting commissions, etc., if the need arises for dealing on the commission basis. During the week there was practically no business done, as there was no demand for anything except some steel grades and very little of that. There was no trading of consequence among the dealers and generally the tendency shown was to play a waiting game until the industries reach a point at which they must enter the market for new supplies. Most of the local industries are covered for some time and rolling mill grades are particularly quiet. Lists out include 800 tons from the Mobile and Ohio, 3000 tons from the Wabash, 300 tons from the Missouri Pacific and 200 tons from the Missouri, Kansas & Texas. These lists reflected in the selling the softened tendencies of the market.

	Per Gross Ton	
Old iron rails	$36.50 to	$37.00
Old steel rails, rerolling	33.50 to	34.00
Old steel rails, less than 3 ft	31.00 to	31.50
Relaying rails, standard sections, subject to inspection	60.00 to	65.00
Old carwheels	28.50 to	29.00
No. 1 railroad heavy melting steel scrap	27.50 to	28.00
Heavy shoveling steel	26.50 to	27.00
Ordinary shoveling steel	26.00 to	26.50
Frogs, switches and guards cut apart	28.50 to	29.00
Ordinary bundled sheet scrap	23.50 to	24.00
Heavy axle and tire turnings	20.50 to	21.00
Per Net Ton		
Iron angle bars	$33.00 to	$33.50
Steel angle bars	27.00 to	27.50
Iron car axles	40.00 to	40.50
Steel car axles	40.00 to	40.50
Wrought arch bars and transoms	40.00 to	40.50
No. 1 railroad wrought	28.50 to	29.00
No. 2 railroad wrought	27.00 to	27.50
Railroad springs	28.50 to	29.00
Steel couplers and knuckles	29.50 to	30.00
Locomotive tires, 42 in. and over, smooth inside	36.00 to	36.50
No. 1 dealers' forge	26.00 to	26.50
Cast iron borings	15.00 to	15.50
No. 1 busheling	24.50 to	25.00
No. 1 boilers, cut to sheets and rings	22.00 to	22.50
No. 1 railroad cast scrap	25.00 to	25.50
Stove plate and light cast scrap	20.00 to	20.50
Railroad malleable	26.50 to	27.00
Agricultural malleable	25.50 to	26.00
Pipes and flues	23.00 to	23.50
Heavy railroad sheet and tank scrap	22.50 to	23.00
Railroad grate bars	20.50 to	21.00
Machine shop turnings	16.00 to	16.50
Country mixed scrap	19.00 to	19.50
Uncut railroad mixed scrap	23.50 to	24.00

Buffalo

BUFFALO, May 6.

Pig Iron.—There is no let up in the besieging of producers with inquiries for iron of all kinds, notwithstanding the fact that melters realize there is little hope of getting orders accepted for anything that does not go into war requirements and that orders for such requirements have been taken to practically full capacity of furnaces to the end of the year, as the tonnage of Government demand is enormous. An occasional small lot of off grade iron is about all there is to dispose of in the way of new business. One producing interest received inquiry the past week for approximately 12,000 tons of foundry, malleable, special high silicon and manganese iron, but could not take on a pound of it. It is stated that a portion of the inquiry for malleable for the American Car & Foundry Co. mentioned in last week's report has been taken care of outside of this district, but a large additional tonnage is being inquired for by that company. Furnacemen are bending every effort to the getting out and forwarding of iron for Government work, but are barely able to keep pace with the demand. All of the local stacks of the Buffalo Union Furnace Co. are again in operation to capacity. Its leased furnace at Troy, N. Y., will, it is planned, be started up on ferromanganese within a few weeks. We continue the fixed schedule as follows, f.o.b. furnace, Buffalo:

No. 1 foundry, 2.75 to 3.25 silicon	$34.50
No. 2 X, 2.25 to 2.75 silicon	33.50
No. 3 foundry, 1.75 to 2.25 silicon	32.50
Gray forge	32.00
Malleable	33.50
Basic	32.00
Lake Superior charcoal, regular grades, f.o.b. Buffalo	37.50

Finished Iron and Steel.—Requirements of the War Industries Board are absorbing nearly, if not quite, 100 per cent of practically all lines of finished products. In compliance with the pledge made to that board at the meeting of manufacturers held in New York, producers are subordinating all commercial business and devoting maximum capacity to the national emergency; filling present obligations as permitted and giving the Government A priorities the full right of way.

Old Material.—The Government decision awarding three and one-half per cent commission to dealers has cleared the situation of uncertainty and places the scrap business upon a more assured basis. It is felt it will prove beneficial to the trade and the restrictions placed in effect by the decision will safeguard against any abuse of the privilege for the future. Consumers are of the opinion that prices for cast scrap, malleable and No. 1 busheling are on too high a basis and should be revised downward—even before July 1, at which time the matter of prices on scrap materials is to be taken up by the Government for further revision. The price of relaying rails is also thought by consumers to be much too high and should receive attention by the Government, which has been purchasing large quantities for use at cantonments and ship yards. The week has shown continued good demand for all classes of scrap and the price schedule remains unchanged, as follows, per gross ton, f.o.b., Buffalo:

Heavy melting steel	$29.00	
No. 1 low phosphorus, heavy, 0.04 and under	39.00	
Low phosphorus, 0.04 and under	36.50	
Low phosphorus, not guaranteed	34.00	
No. 1 railroad wrought	34.00	
No. 1 railroad and machinery cast	34.00	
Iron axles	$44.00 to	46.00
Steel axles	44.00 to	46.00
Carwheels	29.00	
Railroad malleable	34.00	
Machine shop turnings	17.00 to	17.50
Heavy axle turnings	24.00	
Clean cast borings	18.00 to	19.00
Iron rails	36.00 to	37.00
Locomotive grate bars	24.50 to	25.00
Stove plate	24.50 to	25.00
Wrought pipe	27.00 to	28.00
No. 1 busheling scrap	29.00 to	30.00
No. 2 busheling scrap	21.00 to	23.00
Bundled sheet stamping scrap	21.00 to	23.00

Cincinnati

CINCINNATI, May 7—(*By Wire*).

Pig Iron.—The announced purpose of the Government to regulate the distribution of pig iron will probably not disturb existing conditions in this territory. The consumption of foundry iron is practically all by firms having war contracts, and as far as basic is concerned there is now no question that more than 90 per cent of it is for essential industries. It is reported that some Bessemer iron has been bought by locomotive tube makers who have rush orders. This is considered somewhat out of the ordinary. The inquiry for foundry iron is heavier, but business is lighter. Few furnaces are taking on any business for last half shipment and

for nearby delivery only odd casts that do not fit in on general orders can be disposed of. There are no questions raised by the consumers as to the quality of the iron to be had, the particular object being to obtain the material. Shipments from all districts are moving much better, but occasional embargoes cause Southern furnaces considerable trouble. However, iron after it leaves a shipping point is moved much faster than it was 30 days ago.

Based on freight rates of $2.90 from Birmingham and $1.26 Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 2 foundry and No. 2 soft	$35.90
Southern Ohio, No. 2	34.26
Basic, Northern	33.26

Finished Material.—The jobbers are somewhat apprehensive about replenishing their stocks. At the present moment, standard sizes of bars and structural shapes are being shipped out much faster than supplies from the mills are received. As a consequence, within a very short time stocks will be badly depleted or probably in some cases completely exhausted. It is hoped that the Government's requirements are not so urgent as to cause a cessation of all activities in non-essential industries, but probably within the next 10 days something more definite on this question will be known. The rolling mills in this section are now shipping almost their entire outputs to firms having war contracts and the sheet metal contracts have already begun to have considerable trouble in obtaining stocks for ordinary work. Wire nails are coming forward a little more freely, but shipments of barb wire are very much behind the schedule. Fairly prompt deliveries of high-speed steel can be made with all shipments going forward by express.

Jobbers' prices are as follows: Iron and steel bars, 4.08½c.; twisted bars, 4.36½c. base; structural shapes, 4.18½c.; plates, ¼-in. and heavier, 4.43½c.; No. 10 blue annealed sheets, 5.43½c.; cold rolled shafting, 10 per cent plus list. The mill price on No. 28 black sheets remains at 5.18½c. and on No. 28 galvanized, 6.43½c. The warehouse price on wire nails is unchanged at $4 per keg base.

Old Material.—The decision on the commission question has not as yet affected the market here to any extent. The 3½ per cent allowed will give the dealers a little better leeway for handling transactions, but all of them state that this is not sufficient to cover handling and storage charges. Shipments to the Pittsburgh district are still difficult to send forward promtply, but much improvement is reported on scrap moving to Cleveland territory proper. Cast borings and turnings are a trifle firmer, but quotations are unchanged.

The following are dealers' prices f.o.b. at yards, southern Ohio and Cincinnati:

Per Gross Ton	
Bundled sheet scrap	$19.00
Old iron rails	$32.00 to 32.50
Relaying rails, 50 lb. and up	44.00 to 44.50
Rerolling steel rails	31.50 to 32.00
Heavy melting steel scrap	26.00 to 26.50
Steel rails for melting	26.00 to 26.50
Old carwheels	28.00
Per Net Ton	
No. 1 railroad wrought	$28.50 to $29.00
Cast borings	13.00 to 13.50
Steel turnings	13.00 to 13.50
Railroad cast	25.00 to 25.50
No. 1 machinery	25.00 to 25.50
Burnt scrap	16.50 to 17.00
Iron axles	40.00 to 40.50
Locomotive tires (smooth inside)	33.50 to 34.00
Pipes and flues	20.00 to 20.50
Malleable cast	24.00 to 24.50
Railroad tank and sheet	17.00 to 17.50

Non-Ferrous Metal Scrap.—With the exception of block tin pipe, there is not much to report as far as actual transactions are concerned. Block tin scrap is quoted all the way from 80c. to 85c. a pound, and is very scarce. Both copper and brass scrap are slow and the average dealer's buying price on crucible copper is around 21½c. a pound.

Coke.—A few foundry contracts have been renewed with Connellsville firms and some Wise County 72-hr. coke was also sold in this territory for last half shipment. The tonnages involved were not important. No furnace coke has been sold lately to any nearby consumers and none is to be had, unless Connellsville oven operators increase their present output. A much better report is generally made on the movement of shipments from the Connellsville field. Both Pocahontas and Wise County coke seems to be hard to move promptly to destination, although the car shortage is showing some improvement. The local foundries are accumulating some coke, and there is a movement on foot already to lay in a supply against next winter's needs.

New York

NEW YORK, May 7.

Pig Iron.—Owing to the more clearly defined attitude of the Government in regard to taking output of furnaces for the use of companies having Government contracts, the market is at a standstill so far as commercial business is concerned. Recent orders placed by the Government for cars have not resulted in any inquiries for pig iron being sent out by car manufacturers, and it is understood that their requirements will be taken care of to the fullest extent necessary under Government direction. While some formal inquiries are being received from concerns not having Government contracts, they are being pigeon-holed and furnace agents see little prospect of being able to take care of them. We quote as follows for tidewater delivery:

No. 1 X	$35.25
No. 2 X	34.25
No. 2 plain	33.75
No. 1 Southern	$39.75 to 40.25
No. 2 Southern (rail and water)	39.00 to 39.25
No. 2 Southern (all rail)	39.15 to 39.65
No. 2 X Virginia	37.02

Ferroalloys.—The ferromanganese market is at somewhat of a standstill awaiting the developments of a meeting held Tuesday in Pittsburgh by consumers who are considering possible means of conserving manganese in the manufacture of steel. There is no heavy demand, the only large inquiry being for 3000 tons from a Central Western consumer for third quarter delivery. Two or three other inquiries are for 200 to 300 tons each for last half. If there is to be a scarcity later, it is not reflected in the market. Sales have been made of small lots at $250 for 70 per cent metal, and this is the firm quotation with $4 per unit asked for alloy analyzing above this standard. Nothing has developed indicating that importations of British alloy are to be allowed after May 13. The spiegeleisen market is active and strong at $70 to $75, furnace, for 16 to 18 per cent alloy and $77 for 18 to 22 per cent, with $3.50 per unit above the 16 or 18 per cent standard. One large inquiry includes 1000 tons for last half, with several others of fair proportions. Other older inquiries continue unsatisfied. The alloy is scarce, however. Ferrosilicon, 50 per cent, continues strong and active with some demand for export. Quotations range from $150 to $165 per ton on contract with $185 to $190 asked and obtained for spot delivery and export. Some other ferroalloys in which there are few market changes from week to week are quoted in this paragraph in the first week of each month.

Finished Iron and Steel.—One result of the concentration by the mills on products falling under the war winning definition is that some of the mills will enlist the services of selling forces to supplement the Government agencies or perhaps do what such have failed in doing, namely, to ascertain the relative need of every product under order for the different divisions of the Government. They will thus seek to secure maximum co-operation between mill and consumer and the enumeration in the order of time of delivery of the various requirements now perhaps all calling for earliest possible shipment. The object is, of course, that material will be delivered as rapidly as possible to all consignees, but also in the order in which it is to be used. Signs are that special attention may be needed on the part of the Government to move the increasing quantities of discard shell steel. On the 4,000,000 to 5,000,000 tons of such steel to be rolled in the 12 months of this year, the amount of steel in crop ends and the like will probably total 1,250,000 to 1,500,000 tons. Up to the present time some difficulty has been met in selling this steel, owing largely to its relatively

high carbon content for normal uses. What has been sold has mainly been for reinforcing bars and for light section rails. Under the plan of the steel producers to subordinate production of anything not essential to the war program, it would at present be relatively difficult to roll such steel unless the mill otherwise is engaged to its maximum either in its steel-making department or in its finishing mills. Some mills already have supplies of 15,000 and 20,000 tons of discard steel, and a point is made that in spite of greater difficulty in fabrication, some war commodities, such as the recent lot of angle stakes for wire entanglements, might well have been turned out of this discard material. In structural steel mention may be made of the following work closed: Pier for the Government warehouse in Boston, 3400 tons, placed with the New England Structural Co.; 350 tons for the Gilbert & Barker Mfg. Co., Springfield, Mass.; 200 tons for the Baltimore & Ohio, this placed with the Bethlehem Steel Bridge Corporation, and 1670 tons for a dry dock at Galveston. The Chesapeake & Ohio is in the market for two bridges involving 400 tons; 700 tons is involved in work at the San Diego aviation fields and 150 tons for an extension to an inspection shed for the New York Municipal Railways, Brooklyn. The mechanical repair shop project for the Quartermaster Department at San Antonio, Tex., has been definitely abandoned. Mill shipments are quoted as follows: Steel bars, 3.095c.; shapes, 3.195c.; plates, 3.445c., and bar iron, 3.695c., all at New York. Out-of-store prices are 1c. higher.

Cast Iron Pipe.—On 600 tons of cast iron pipe, mostly 42 in. and 32 in., practically Government prices were bid by Hartford, Conn., and the contract was awarded to the Warren Foundry & Machine Co. This is the only public business of importance recently let and none is in prospect for the early future. One company reports that 80 per cent of its business at present is going to the Government. Government prices are as follows: $55.35, New York, for 6-in. and heavier, and $58.35 for 4-in; $65.35 for 3-in.; and $1 additional for Class A and gas pipe.

Old Material.—The allowing of the payment of a commission has caused a better feeling in the market, which is strong on all grades except turnings. The market is especially strong on cast scrap. The Italian Government is making another effort in a quiet way to sell the 40,000 to 50,000 tons of scrap which has been stored in Baltimore for many months. While this scrap has been described as heavy melting grade, inspection has shown that there is some low phosphorus and a considerable tonnage of other scrap. The outcome of the present negotiations is awaited with much interest. We quote prices of brokers to New York producers and dealers, per gross ton, New York:

	Per Gross Ton
Heavy melting steel	$25.70 to $26.00
Rerolling rails	31.60
Relaying rails	60.00 to 70.00
Iron and steel car axles	44.00 to 44.30
No. 1 railroad wrought	31.50 to 31.80
No. 1 railroad wrought cut to not less than 10 in. or over 24 in.	36.50 to 36.80
Wrought-iron track scrap	30.50 to 30.80
No. 1 yard wrought long	30.50 to 30.80
Light iron	9.00 to 10.00
Cast borings (clean)	16.00 to 16.25
Machine-shop turnings	15.75 to 16.00
Mixed borings and turnings	15.50 to 16.00
Iron and steel pipe (1 in. minimum diameter), not under 2 ft. long	29.75

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, are:

No. 1 machinery cast	$34.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	34.00
No. 1 heavy cast, not cupola size	29.00
No. 1 cast (radiators, cast boilers, etc.)	$27.00 to 28.00
Stove plate	25.00 to 26.00
Locomotive grate bars	25.00 to 26.00
Malleable cast (railroad)	34.00
Old carwheels	29.00

The J. Lipsitz Co., Inc., 289 Third Street, Chelsea, Mass., dealer in scrap iron, steel and metals, is installing a large shearing machine of the alligator type, and has increased its trackage by 600 ft., which gives a total siding capacity of 26 cars.

British Steel Market

Pig Iron Transportation Improved—American Deliveries Half Completed

LONDON, ENGLAND, May 8—(*By Cable*).

Pig iron transportation conditions have improved and deliveries are increasing. No quotations on American semi-finished are made. Tin plates are strong at 33s. 6d. Ferromanganese is quiet but firm. Benzol and other coal-tar chemicals are firm at nominal quotations. Baldwins, Ltd., has amalgamated with the Brymbo Co., Ltd., and purchased new large ore deposits in Oxfordshire. We quote as follows:

Tin plates coke, 14 x 20: 112 sheets, 108 lb., f.o.b. Wales, 33s. 6d.

Ferromanganese, $250, c.i.f. for export to America; £26 10s. for British consumption.

Ferrosilicon, 50 per cent, c.i.f: £35 upward.

On other products control prices per gross ton are:

Hematite pig iron, East Coast, £6 2s. 6d.; West Coast, £6 7s. 6d.

Cleveland pig iron, £4 15s. to £4 19s.

Steel plates, ship, bridge and tank, £11 10s.

Steel sheets, black plate, all open annealed, produced in sheet mills, £16 to £18.

Bar iron, standard quality, £13 17s. 6d.; marked, £16.

Sheet and tin plate bars, £10 7s. 6d.

Blooms and billets for rerolling (ordinary), £10 7s. 6d.; special quality, £11.

Cleveland

CLEVELAND, May 7.

Iron Ore.—Shipments from upper Lake ports have been rather slow so far, but a better movement is looked for this week. Many ore carriers have been delayed at Lake Superior ports waiting for cargoes. Shipments during April amounted to 235,870 gross tons, as compared with 211,532 tons a year ago. Although the carrying capacity of the Lake fleet is less than a year ago owing to the fact that a number of boats have been diverted from the Lake trade for ocean service, it is believed that the vessels will be able to bring down all the ore that will be required this year provided the railroads are able to handle it promptly at the lower Lake ports. The storage facilities at the docks will be less than ever before owing to the large amount of ore on docks at the opening of navigation, and unless cars are available, the Lake movement is likely to be curtailed somewhat. Dock laborers at Ashland and Escanaba returned to work Monday. They recently refused to accept a wage increase offered them by the railroads and had not previously started to work this spring. Their wage demands will be considered by the Governments Railroad Arbitration Board. We quote, f.o.b., Cleveland lower Lake ports as follows:

Old range Bessemer, $5.95; old range non-Bessemer, $5.20; Mesaba Bessemer, $5.70; Mesaba non-Bessemer, $5.05.

Pig Iron.—The Government has allocated 2400 tons of foundry iron and 500 tons of charcoal iron for the Norfolk Navy Yard. New Government inquiries are for 300 tons of foundry iron for Seattle, Wash.; 1200 tons for Bucyrus and Willoughby, Ohio, and 200 tons for Houston, Tex., for the Emergency Fleet Corporation; 1200 tons of Bessemer for May delivery for the Ordnance Department and 3500 tons of basic for a New Jersey plant. A Cleveland foundry is inquiring for 1000 tons of Southern iron for early shipment. While many Southern producers are not selling iron at present, some have reserved about 25 per cent of their tonnage for Government requirements. There is a heavy demand for silvery iron, but furnaces have taken on all the tonnage they are willing to at present.

Bessemer	$36.15
Basic	32.30
Northern No. 2 foundry	33.30
Southern No. 2 foundry	37.00
Gray forge	32.30
Ohio silvery, 8 per cent silicon	46.12
Standard low phosphorus, Valley furnace	53.00

Coke.—Shipments are now very satisfactory, and foundries are well supplied. Under the zone system, Virginia coke producers are no longer permitted to sell coke in the Cleveland territory, but no such re-

strictions have been placed on the Connellsville district. However, it is the intention to have nearly all the Cleveland foundries supplied with by-product coke made by the McKinney Steel Co.

Bolts, Nuts and Rivets.—The demand for bolts and nuts has improved considerably. Manufacturers attribute this to the fact that consumers fear that they will be unable to obtain a supply because of the diversion of the entire steel output of the country to the needs of the Government and for essential industries. Some of the leading bolt and nut makers are now using bar iron almost exclusively in the manufacture of their product, and others are expected to substitute iron for steel. Rivet specifications are very heavy, practically all the tonnage going to shipbuilding plants or to other manufacturers filling Government orders.

Old Material.—The allowance of commissions to scrap dealers has so far caused little revival of activity in the market. Mills are mostly covered with second quarter contracts, but will take on additional tonnage of heavy melting steel. Dealers look for a heavy buying in the next few weeks for the third quarter. Borings and turnings are weak, the only demand at present in this market apparently being for shipment to the Pittsburgh district. There is very little demand for cast scrap and busheling. Rolling mills are at present well supplied with the latter, but the increased demand for bar iron is expected to make busheling more active. A round tonnage of scrap was sold by the New York Central Railroad last week at Government prices. The new scrap regulations by the Government that include a provision that requires transactions be made for an agreed tonnage will eliminate the taking of open orders. Dealers quote, f.o.b., Cleveland, as follows:

Steel rails	$27.00 to $28.00
Steel rails, rerolling	34.00
Steel rails, under 3 ft	34.50
Iron rails	39.00
Iron car axles	46.50
Steel car axles	46.50
Heavy melting steel	29.00
Cast borings	16.50 to 17.00
Iron and steel turnings and drillings	16.50 to 17.00
No. 1 railroad wrought	34.00
Hydraulic compressed sheet scrap	28.00 to 29.00
Cast iron car wheels, unbroken	29.00
Cast iron car wheels, broken	34.00
Agricultural malleable	24.00 to 25.00
Railroad malleable	34.00
Steel axle turnings	24.00
Light bundled sheet scrap	24.50 to 25.00
Cast iron scrap	29.00
Cast iron scrap, broken to cupola size	30.50 to 31.00
No. 1 busheling	29.50 to 30.50
Per Net Ton	
Railroad grate bars	21.00 to 21.50
Stove plate	21.00 to 21.50

Finished Iron and Steel.—Manufacturers in commercial industries face imminent danger of being compelled to curtail operations or having to shut down their plants entirely because of the pledge by steelmakers to supply steel only for Government requirements. In the Central West it is expected that the auto industry will suffer the most, as the pleasure car is apparently classed by the Government as a nonessential. Makers of pleasure cars are now operating at about 50 per cent of capacity, and it is believed that this production would further be cut one-half. This curtailment will fall most heavily in the Cleveland territory on makers of automobile parts who use a very heavy tonnage of steel. Some of these plants are operating partly on motor truck work for the Government, and to that extent will not be affected, but others, such as plants that specialize on light springs for pleasure cars, will have to take on Government work or shut down when their supply of steel is exhausted. Manufacturers' stocks are generally low, as few have been able for months to get material as fast as needed. Makers of stock products were unable to secure steel except for the portion of their output needed for the Government. One of the largest Ohio tank shops advised a Cleveland mill agency this week that unless it could secure a supply of plates at once it would have to shut down its plant, but the material cannot be furnished.

Jobbers have a fair stock of steel bars, but their stocks of plates and structural material are low, and consumers who depend on jobbers for their steel will doubtless soon find supplies exhausted. Jobbers have no hope of replenishing stocks until the Government's needs are met. Considerable steel in plates and shapes has recently been offered from stocks by bridge companies, but these stocks are now reported to be well cleaned up. The scarcity of steel has stimulated the demand for bar iron which has been lifeless for some time. A new demand has sprung up from bolt and nut makers and from other manufacturers who can substitute iron for steel. It is expected that the car and locomotive building program will shortly result in a demand for bar iron that will tax the capacity of the rolling mills. Sheet consumers are clamoring for deliveries on contracts which they cannot secure until the Government needs are met, and jobbers' stocks of sheets are very low. Semi-finished steel is scarcer than ever. The Empire Rolling Mill Co., Cleveland, being unable to secure sheet bars, will begin rolling sheets from iron in a few days. All the steel for the 66 boats recently placed with the American Shipbuilding Co., amounting to 91,000 tons, has been allotted to the Carnegie Steel Co. and Illinois Steel Co.

We quote warehouse prices as follows: Steel bars, 4.03½c.; plates, 4.38½c.; structural material, 4.13½c.; No. 10 blue annealed sheets, 5.35c.; No. 28 black sheets, 6.35c.; No. 28 galvanized sheets, 7.60c.

IRON AND INDUSTRIAL STOCKS

Liberty Loan Activities Distract Attention from Stock Speculation

Activities connected with the Liberty Loan campaign assumed much energy last week and were reflected in Wall Street, particularly in the municipal bond market, which was very dull; but speculative and investment securities held their own very well, and some industrial stocks made new high records for the current movement.

The first payment on Liberty loan subscriptions did not cause a ripple of excitement and it is not thought that the next payment, amounting to 20 per cent, due May 28, will cause any financial disturbance.

The range of prices on active iron and industrial stocks on Wednesday of last week and Wednesday of this week was as follows:

Allis-Chalm. com.	28¼- 30	Int. Har. Corp. pf.	97¼
Allis-Chalm. pf.	81¾- 83½	Lackaw. Steel	80 - 84¼
Am. Can com.	43½- 45⅞	Lake Super. Corp.	15 - 16¼
Am. Can pf.	96⅜	Lima Loco.	43
Am. Car & Fdry. com.	76¾- 78¾	Midvale Steel	45¼- 47⅝
Am. Car & Fdry. pf.	110½-110⅜	Nat.-Acme	31 - 32¼
Am. Loco. com.	63¾- 65¾	Nat. Enam. & Stm. com.	51½- 53½
Am. Loco. pf.	97½- 98	Nat. Enam. & Stm. pf.	97 - 97¾
Am. Radiator com.	255	N. Y. Air Brake	125 -129
Am. Radiator pf.	130	Nova Scotia Stl.	60 - 63
Am. Ship com.	125 -128½	Pittsburgh Stl. pf.	91
Am. Steel Fdries.	63 - 64⅞	Pressed Stl. com.	58⅜- 59⅞
Bald. Loco. com.	79 - 81¾	Ry. Steel Springs com.	55 - 55¾
Bald. Loco. pf.	98½	Ry. Steel Springs pf.	97⅞
Beth. Steel com.	80½- 84	Republic com.	81 - 87½
Beth. Stl. Cl. B.	78 - 84⅝	Republic pf.	97¾- 98
Cambria Steel	127	Sloss com.	58 - 62
Carbon Stl. com.	110 -112	Superior Steel	40 - 45½
Case (J. I.) pf.	85¾- 87	Un. Alloy Steel	39¾- 40½
Cent. Fdry. com.	39 - 41	U. S. Pipe com.	13⅛
Cent. Fdry. pf.	49½- 50½	U. S. Steel com.	95¾-103¾
Chic. Pneu. Tool.	67½- 69	U. S. Steel pf.	109¾-111¼
Colo. Fuel	39¾- 44¼	Va. I. C. & Coke.	67½- 69
Cruc. Steel com.	63½- 67½	Warwick	7¾- 8¼
Cruc. Steel pf.	89⅞	Westingh. Elec.	40¾- 42¾
Gen. Electric	142 -146¼		
Gt. No. Ore Cert.	29¼- 31⅜		
Gulf States Steel.	104¼-107½		
Int. Har. of N. J. com.	121 -131⅜		

The United States Motor Truck Co., Covington, Ky., a Cincinnati suburb, has started foundations for an addition to its plant that will be 75 x 190 ft., three stories, brick and steel construction. The company is building a large number of motor trucks for Government service both in this country and in France.

The Union Iron Works Alameda plant is to have a main entrance with 40 separate gates and time-checking clocks for each gate, all being able to handle, during the rush hours, a maximum of 15,000 workmen. At present 7000 are employed.

Metal Markets

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin,	Lead		Spelter	
May	Lake	Electro-lytic	New York	New York	St. Louis	New York	St. Louis
1	23.50	23.50	*97.00	6.75	6.55	7.00	6.75
2	23.50	23.50	*98.00	6.65	6.45	7.00	6.75
3	23.50	23.50	*99.00	6.62½	6.42½	7.00	6.75
4	23.50	23.50	....	6.62½	6.42½	7.00	6.75
6	23.50	23.50	*$1.00	6.62½	6.42½	7.12½	6.75
7	23.50	23.50	*$1.00	6.62½	6.42½	7.12½	6.75

*Nominal.

NEW YORK, May 8, 1918.

The markets are all quiet, but some are more active than a week ago. Copper is in strong demand, but awaits price-fixing developments. Tin prices continue to skyrocket but very little business is possible. Lead is very quiet and lower. Spelter is stronger and higher. Antimony is more active and firmer.

New York

Copper.—It develops that the meeting held in Washington early last week was one at which no copper producers were present, but one in which the refiners discussed with Government representatives the condition in that branch of the industry. What developed is unknown, except that the refiners presented their case as to mounting costs and the inroads on profits because contracts for compensation date back in some cases before the war. The meeting at which the possible revision of the 23.50c. price, effective until June 1, is to be discussed, will be held May 22. Copper producers will be fully represented at this. A disturbing factor bearing on the whole industry is the fact that representatives of the labor engaged in producing copper are about to make representations to Washington that an advance in wages is imperative, due to the increased cost of living. Demands for copper for May delivery are very large for war purposes, both Allied and American, and there is some likelihood that there will be difficulty in supplying what is needed.

Tin.—Very little business has been done or could be done for any position in any grade of tin in the last week, and in fact no large business is any longer possible under present conditions. The entire situation is serious. Prices have continued to rise again sharply, both here and abroad. For spot tin of any grade $1 to $1.05 per lb. would be readily paid if the metal were obtainable and we quote $1 as the nominal price. For future shipment from the East as high as 95c. to 98c. is the quotation for any position. Such prices have never before been heard of. In London spot Straits has gone to £381 per ton, an advance of £20 in the week. In England the Government has virtually taken control of the metal, for now Government permission must be obtained to buy or sell tin. A few parcels of tin for shipment from the Far East have been sold there to American consumers under the new rules, but the amount is meager. As to Dutch tin, reports are that sailings from Batavia will be permitted. Arrivals to May 6, inclusive, have been 275 tons. Deliveries of tin in April were 550 tons at Atlantic ports, with 4495 tons coming from Pacific ports. Tin in stocks and landing on April 30 were 64 tons.

Lead.—The market continues very quiet, with general conditions still unchanged. Many large sellers have nothing to offer or will not meet present prices. A few, however, have been offering enough more than the present demand to cause the market to decline so that lead can be bought now at 6.62½c., New York, or 6.42½c., St. Louis, for early delivery. There is, however, a decided lack of interest which is unusual at this time of year. The American Smelting & Refining Co. still maintains its quotation at 7c., New York.

Spelter.—A decided change has come over the market and the tone is more cheerful. Some think that the bottom was reached in the last few weeks. For May delivery prime Western is now quoted and sold at 6.87½c. to 7c., St. Louis, or 7.12½c. to 7.25c., New York, with 7c., St. Louis, or 7.25c., New York, the minimum for June. It is understood that there have been large sales of both Grade A and lower grades to the Government with more yet to be purchased. This is one cause of the firmer market. It is also true that several large producers are refusing to quote at present levels, which is another factor. Demand in general is not large, but interest in the market is growing.

Antimony.—The past week has been fairly active at 13c. to 13.25c., New York, duty paid, which continues the quotation. The Government is reported a large buyer again but no details are made public.

Aluminum.—Government prices control the market for No. 1 virgin metal, 98 to 99 per cent pure, and range from 32c. to 32.20c. per lb. in lots of 50 tons down to one ton.

Chicago

MAY 7.—The tin market cannot be called excited yet there is a quiet scramble to get the metal, the price of which is now $1.05 to $1.15 per pound. Only a little is available. Copper is in sturdy demand at the Government price of 23.50c. for carloads and 24.67½c. for part carloads. There is very little inquiry for lead, the metal being obtainable at 6.60c. Spelter is a little stronger at 6.85c. to 6.90c., but without notable movement. Antimony continues quiet at 15c. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 21c.; copper clips, 21c.; copper bottoms, 19c.; red brass, 21c.; yellow brass, 14c.; lead pipe, 5c.; zinc, 4.50c.; pewter, No. 1, 60c.; tinfoil, 65c.; block tin, 70c.

St. Louis

MAY 6.—Non-ferrous markets in the past week have shown a softening tendency, with no sharp price changes. Quotations to-day on carload lots were: Lead, soft Missouri, 6.55c.; spelter, 6.75c. In less than carload lots: Lead, 7c. to 7.25c.; spelter, 7.50c.; tin, nominal, $1, none available; copper, 25.12½c.; Asiatic antimony, 15c. In the Joplin district there was a stiffening of prices on top grade ores as a result of expectations of an agreement with smelters to pay more hereafter for high-grade ores, though no similar agreement was regarded as possible on low-grade ores. About 2500 tons of top-grade ore is produced in the district per week, and this is being held, pending developments, at $70 per ton, which is approximately $27.50 above the average which has long prevailed for all ores in the district. Second-grade ores have ranged down as low as $35 per ton. Lead ore was steady at $80 per ton. Calamine, basis 40 per cent, was quiet at $28 to $32 per ton, with the week's average $30 per ton. On miscellaneous scrap metals quotations are: Light brass, 10c.; heavy yellow brass, 14c.; heavy red brass and light copper, 19.50c.; heavy copper and copper wire, 20c.; pewter, 25c.; tinfoil, 55c.; lead, 5.50c.; zinc, 5c.; tea lead, 5c.

Sharp Reduction in Manganese Imports

March imports of manganese ore were only 19,300 gross tons as compared with an average of 51,118 tons for both January and February. This is a drastic cut for the monthly average in 1917, which was 52,498 tons. It is also less than the monthly average of the five-year period (1910-1914) before the war, when imports were 22,470 tons per month. They have not been as low as 19,000 tons in over two years. For March, 1917, the figures were 56,394 tons.

The Philadelphia Foundrymen's Association, which had its monthly meeting Wednesday, May 1, listened to an interesting discussion on electric furnaces by F. J. Ryan, general manager of the Electric Furnace Construction Co., Philadelphia, which is the American agent for the Greaves & Etchells electric furnace. The meeting was held at the Manufacturers' Club and was followed by a lunch of Delaware River shad and roe.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight rates from Pittsburgh on iron and steel articles, aside from wrought iron and steel pipe in carloads, per 100 lb., New York, 19.5c.; Philadelphia, 18.5c.; Boston, 21.5c.; Buffalo, 11.6c.; Cleveland, 13.5c.; Cincinnati, 18.5c.; Indianapolis, 20c.; Chicago, 21.5c.; St. Louis, 27c.; Kansas City, 47c.; minimum carload, 36,000 lb.; St. Paul, 40c.; minimum carload, 36,000 lb.; Denver, 79c.; minimum carload, 36,000 lb.; Omaha, 47c.; minimum carload, 36,000 lb.; New Orleans, 30.7c.; Birmingham, 46c.; Pacific Coast, $1.00; minimum carload, 80,000 lb. To the Pacific Coast the rate on steel bars and structural steel is $1.05, minimum carload, 40,000 lb.; and $1.00, minimum carload, 50,000 lb. On wrought iron and steel pipe the rate from Pittsburgh to Kansas City is 40c. per 100 lb., minimum carload 46,000 lb.; to Omaha, 40c., minimum carload 46,000 lb.; to St. Paul, 35.5c., minimum carload 46,000 lb.; Denver, 79c., minimum carload 46,000 lb. A 3 per cent transportation tax now applies. On iron and steel items not noted above, rates vary somewhat, and are given in detail in the regular railroad tariffs.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in. angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees, structural sizes, 3c.

Wire Products

Wire nails, $3.50 base per keg; galvanized, 1 in. and longer, including large-head barb roofing nails taking an advance over this price of $2, and shorter than 1 in., $2.50. Bright basic wire, $3.35 per 100 lb.; annealed fence wire, Nos. 6 to 9, $3.25; galvanized wire, $3.95; galvanized barb wire and fence staples, $4.35; painted barb wire, $3.65; polished fence staples, $3.65; cement-coated nails, $3.40 base; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 47 per cent off list for carload lots, 46 per cent for 1000-rod lots, and 45 per cent off for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large rivets ..... $4.65 base
7/16 in. x 6 in. smaller and shorter rivets. 45-10 per cent off list
Machine bolts h.p. nuts, ⅝ in. x 4 in.:
Smaller and shorter, rolled threads.... 50-10-5 per cent off list
Cut threads ..... 50-5 per cent off list
Larger and longer sizes..... 40-10 per cent off list
Machine bolts c.p.c. and t. nuts, ⅝ in. x 4 in.:
Smaller and shorter..... 40-10 per cent off list
Larger and longer..... 35-5 per cent off list
Carriage bolts, ¾ in. x 5 in.:
Smaller and shorter, rolled threads..... 50-5 per cent off list
Cut threads ..... 40-10 per cent off list
Larger and longer sizes..... 40 per cent off list
Lag bolts ..... 50-10 per cent off list
Plow bolts, Nos. 1, 2, 3..... 50 per cent off list
Hot pressed nuts, sq., blank..... 2.50c. per lb. off list
Hot pressed nuts, hex., blank..... 2.30c. per lb. off list
Hot pressed nuts, sq., tapped..... 2.30c. per lb. off list
Hot pressed nuts, hex., tapped..... 2.10c. per lb. off list
C.p.c. and t. sq. and hex. nuts, blank..... 2.25c. per lb. off list
C.p.c. and t. sq. and hex. nuts, tapped..... 2.00c. per lb. off list
Semi-finished hex. nuts:
⅝ in. and larger..... 60-10-10 per cent off list
9/16 in. and smaller..... 70-5 per cent off list
Stove bolts ..... 70-10 per cent off list
Stove bolts ..... 2½ per cent extra for bulk
Tire bolts ..... 50-10-5 per cent off list
The above discounts are from present lists now in effect. All prices carry standard extras.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $57; chain rods, $65; screw, rivet and bolt rods and other rods of that character, $65. Prices on high carbon rods are irregular. They range from $70 to $80, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16 in. x 4½ in. and heavier, per 100 lb., $3.90, in lots of 200 kegs of 200 lb. each, or more; track bolts, $4.90. Boat spikes, $5.25 per 100 lb., f.o.b. Pittsburgh.

Terne Plate

Effective Nov. 7 prices on all sizes of terne plates are as follows: 8-lb. coating, 200 lb., $15 per package; 8-lb. coating, I. C., $15.30; 12-lb. coating, I. C., $16.75; 15-lb. coating, I. C., $17.75; 20-lb. coating, I. C., $19; 25-lb. coating, I. C., $20; 30-lb. coating, I. C., $21; 35-lb. coating, I. C., $22; 40-lb. coating, I. C., $23 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars at 2.90c. from mill, and 4.50c. to 5c. from warehouse in small lots for prompt shipment. Refined iron bars, 3.50c. in carload and larger lots, f.o.b. mill.

Wrought Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card, as announced Nov. 5 by the Government on steel pipe, those on iron pipe being the same as quoted for some time:

Butt Weld

Steel: Inches	Black	Galv.	Iron: Inches	Black	Galv.
⅛, ¼ and ⅜	44	17½	⅛ and ¼	23	+4
½	48	33½	⅜	24	+3
¾ to 3	51	37½	½	28	10
			¾ to 1½	33	17

Lap Weld

2	44	31½	1¼	18	3
2½ to 6	47	34½	1½	25	11
7 to 12	44	30½	2	26	12
13 and 14	34½	..	2½ to 6	28	15
15	32	..	7 to 12	25	12

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜	40	22½	⅛, ¼ and ⅜	22	5
½	45	32½	½	27	14
¾ to 1½	49	36½	¾ to 1½	33	18
2 to 3	50	37½			

Lap Weld, extra strong, plain ends

2	42	30½	1¼	19	4
2½ to 4	45	33½	1½	25	11
4½ to 6	44	32½	2	27	14
7 to 8	40	26½	2½ to 4	29	17
9 to 12	35	21½	4½ to 6	28	16
			7 to 8	20	8
			9 to 12	15	3

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variations in weight of 5 per cent. Prices for less than carloads are four (4) points lower basing (higher price) than the above discounts on black and 5½ points on galvanized.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers are seven (7) points lower (higher price) than carload lots, and on butt and lap weld galvanized iron pipe are nine (9) points lower (higher price)

Boiler Tubes

The following are the prices for carload lots, f.o.b. Pittsburgh, announced Nov. 13, as agreed upon by manufacturers and the Government:

Lap Welded Steel		*Charcoal Iron*	
3½ to 4½ in.	34	3½ to 4½ in.	12½
2½ to 3¼ in.	24	3 to 3¼ in.	+ 5
2¼ in.	17½	2½ to 2¾ in.	+ 7½
1¾ to 2 in.	13	2 to 2¼ in.	+22½
		1¾ to 1⅞ in.	+35

Standard Commercial Seamless—Cold Drawn or Hot Rolled

Per Net Ton		Per Net Ton	
1 in.	$340	1¾ in.	$220
1¼ in.	280	2 to 2½ in.	190
1⅜ in.	270	2¾ to 3¾ in.	180
1½ in.	220	4 in.	200
		4½ to 5 in.	220

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department, which will be subject to special negotiation.

Sheets

Makers' price for mill shipments on sheets of United States standard gage in carload and larger lots, are as follows, 30 days net or 2 per cent discount in 10 days:

Blue Annealed—Bessemer	Cents per lb.
No. 8 and heavier	4.20
Nos. 9 and 10	4.25
Nos. 11 and 12	4.30
Nos. 13 and 14	4.35
Nos. 15 and 16	4.45
Box Annealed, One Pass Cold Rolled—Bessemer	
Nos. 17 to 21	4.80
Nos. 22 and 24	4.85
Nos. 25 and 26	4.90
No. 27	4.95
No. 28	5.00
No. 29	5.10
No. 30	5.20
Galvanized Black Sheet Gage—Bessemer	
Nos. 10 and 11	5.25
Nos. 12 and 14	5.35
Nos. 15 and 16	5.50
Nos. 17 to 21	5.65
Nos. 22 and 24	5.80
Nos. 25 and 26	5.95
No. 27	6.10
No. 28	6.25
No. 29	6.50
No. 30	6.75
Tin-Mill Black Plate—Bessemer	
Nos. 15 and 16	4.80
Nos. 17 to 21	4.85
Nos. 22 to 24	4.90
Nos. 25 and 27	4.95
No. 28	5.00
No. 29	5.05
No. 30	5.05
Nos. 30½ and 31	5.10

PERSONAL

Howard Coonley, president Walworth Mfg. Co., Boston, and vice-president Boston Chamber of Commerce, has been appointed vice-president of the Emergency Fleet Corporation and will have charge of the general administration of the corporation, including contracts, purchasing, financing and accounting. He was the personal choice of the new Director-General Charles M. Schwab. Mr. Coonley was born in Chicago and was graduated from Harvard in 1899. He first became connected with the Walter Baker Co., chocolate manufacturer, in its Chicago office and later went to the company's New York office. Returning to Chicago, he entered into manufacturing, leaving that city in March, 1913, to become president of the Walworth Mfg. Co., but retaining his Chicago interests. Since his connection with the Walworth company, he has become recognized as one of the business leaders of Boston and has acquired a reputation for unusual administrative ability.

John G. Schindehette, Ann Arbor, Mich., has become traffic manager of the Motor Products Co., Detroit.

Henry L. Innes, until recently assistant general manager of the General Motors Co., New York, has become associated with the Doble-Detroit Steam Motors Co., Detroit, in the capacity of vice-president and general manager.

Wendell P. Norton, works manager Hendey Machine Co., Torrington, Conn., connected with that company for 28 years as superintendent, has resigned. He had acquired a high reputation for his inventions, particularly for his improvements in lathe design.

J. M. Riordan has joined the selling organization of the Cleveland Milling Machine Co., Cleveland. He was recently sales engineer of the Grant Lees Gear Co., Cleveland, and prior to that was central states representative of the Fellows Gear Shaper Co.

E. E. Maher has been appointed by the Terry Steam Turbine Co. manager for the Chicago district, with offices at 1328-29 McCormick Building, 322 South Michigan Avenue. John D. Stout has been appointed manager of the New York office of the company, in charge of that district with the exception of navy and marine installations. Mr. Stout has been assisting Mr. Herbert, formerly in complete charge of that district, who will now devote his entire time to navy and marine requirements.

Chester D. Tripp, Miami Metals Co., Chicago, is spending all his time at Washington, serving the Government in an advisory capacity to the Alloys Committee. He is giving special attention to the problem of utilizing domestic manganese ores in the manufacture of ferromanganese as proven practicable by the Miami Metals Co.

C. Oberstadt has resigned as superintendent of the Elyria Iron & Steel Co.'s Cleveland, Ohio, plant, and has planned for a needed vacation before taking up new work.

George S. Tontrup, general manager of the American Car & Foundry Co. of St. Louis, was seriously injured in an automobile collision the night of May 1 while returning to the city from the Sunset Hill Country Club.

N. O. Nelson, president of the N. O. Nelson Mfg. Co., manufacturer of plumbing supplies, has resigned, but will remain a director. He is succeeded by L. D. Lawnin, for 33 years connected with the company. Alex B. Pierce becomes first vice-president and general manager, W. H. Baker second vice-president and J. A. Senkosky continues as secretary and treasurer. Mr. Nelson will devote himself to business in a different line which he has established in New Orleans.

Harry C. Williamson, who has been the representative of the Betz-Pierce Co., Cleveland, in the Indianapolis district for the past five years, has gone into the service of the Army and will be located at Perdue University, Lafayette, Ind., where he will engage in special work. His successor, E. L. Housh, has been, for a number of years, in the purchasing department of the Nordyke & Marmon Co. His office will be located at 239 East Ohio Street, Indianapolis.

Horace N. Wilson, cashier American Iron and Steel Institute, New York, has resigned to accept a position with the E. I. du Pont de Nemours Co., South Amboy, N. J. Mr. Wilson made a record of exceptional efficiency with the institute.

William A. Field, general manager United Alloy Steel Corporation, Canton, Ohio, has tendered his resignation to take effect May 10, and has offered his services to Charles M. Schwab, director general Emergency Fleet Corporation. His successor may not be appointed for some time. Mr. Field became connected with the United Alloy Steel Corporation Feb. 1, 1917, having previously been connected with the South Chicago works of the Illinois Steel Co., as general superintendent.

John S. Agey, for 13 years connected with one of the plants of the Carnegie Steel Co., at Youngstown, Ohio, has resigned to become superintendent of one of the mills of the Donner Steel Co., Buffalo.

Robert E. McCarty, resident vice-president in Detroit of the Pennsylvania Lines West, has resigned from the chairmanship of the Pittsburgh sub-committee of the Central Traffic Conference Committee of Presidents, with offices in the Union Arcade Building, Pittsburgh. E. A. Peck, assistant to the general manager of the Baltimore and Ohio Railroad, with headquarters in Pittsburgh, and a member of the sub-committee, was elected chairman.

M. T. Lothrop has been appointed assistant factory manager of the Timken Roller Bearing Co., Canton, Ohio. He has been metallurgist and has had charge of the steel and tube department of the company for the past seven years.

Lahman F. Bowers, Milwaukee, who resigned May 1 as secretary of the Allis-Chalmers Mfg. Co., Milwaukee, was associated with the company and its predecessors for 22 years, and devoted nearly 40 years of his life to the service of large machinery manufacturers. After taking a rest on his farm in Virginia, Mr. Bowers intends to make a trip to Japan.

V. Horton, formerly connected with the U. S. Metal & Mfg. Co., New York, is now the representative of the J. Lipsitz Co., Woolworth Building. D. M. Howell, formerly connected with the New York office, is now taking up his duties at the home office in Chelsea, Mass.

The T. P. Walls Tool & Supply Co., Inc., 75-77 Walker Street, New York, has added anther star to its service flag, in honor of Howard J. Walls, son of President Walls. He has enlisted in the Marine Corps, and distinguished himself for bravery at the time of the sinking of the City of Athens by a French cruiser.

W. J. Hanna has been appointed sales manager of the Trumbull Steel Co. for the Detroit territory with offices at 523 Ford Building, Detroit.

Peter J. Hopkins, who has been for the past four years Eastern sales manager in New York for the Cleveland Punch & Shear Works, Cleveland, has joined the Fore River plant of the Bethlehem Shipbuilding Corporation, Quincy, Mass., in an executive capacity. Mr. Hopkins is succeeded in the Eastern territory by C. W. Hancock and R. S. Howell, who come from the company's main office.

Private Standish Meacham, Fifth Field Artillery, now in France, formerly advertising manager Rogers, Brown & Co., was severely wounded by shrapnel April 2. Advices received this week indicate that there is no doubt about his recovery. Mr. Meacham was formerly connected with the Y. M. C. A. in France. He is a son of D. B. Meacham, a member of the firm of Rogers, Brown & Co.

Enemy Aliens in Technical Organization

Two technical organizations in New York have taken important steps regarding membership by enemy aliens. The following resolution has been presented to the board of directors of the American Institute of Mining Engineers for consideration at its next monthly meeting, May 24, at the Engineering Societies Building, 25 West Thirty-ninth Street, New York:

Resolved, That all honorary members, members, associates and junior members who are enemy aliens be dropped from membership in the American Institute of Mining Engineers and their names be stricken from the rolls forever.

Resolved, That the membership committee be requested to advise this board of directors of the names of all above mentioned persons.

Resolved, That publicity of these resolutions be given to members through the local sections and by publication in the Bulletin as well as through the daily press.

The Chemists' Club, 52 East Forty-first Street, New York, has asked for the resignation of all of its members who are enemy aliens and also for that of all others who are not wholly in sympathy with the war aims of the United States Government.

Labor Conditions in the Stove Industry

The unusual conditions confronting the stove industry brought about by the shortage of labor on account of the war were discussed at the annual meeting of the Stove Founders' National Defense Association, held in New York, Tuesday, May 7. As a token of appreciation of the services of President George Mitchell during a year of many troubles, the association voted him a gift of $6,000.

The officers elected for the ensuing year are: President, George Mitchell, Pittston, Pa.; first vice-president, Lewis Moore, Joliet; second vice-president, Joseph E. Anthony, Taunton, Mass.; secretary, Robert W. Sloan, Pittston, Pa.; treasurer, William A. Dwyer, Detroit.

Milwaukee Steel Foundry Buys a Moore Electric Furnace

The Maynard Steel Casting Co., Milwaukee, Wis., has purchased a 3-ton Moore electric furnace and contemplates building an addition to its foundry, 85x200 ft. The Moore furnace is sold by the Pittsburgh Furnace Co., Pittsburgh. The installation of this furnace will bring the number in the United States to 5, there being 4 of this type at the plant of the General Steel Co., St. Francis, Wis.

Newark Foundrymen's Association

The Newark Foundrymen's Association, Newark, N. J., on May 1 re-elected officers as follows: President A. E. Barlow, Barlow Foundry Co., Inc.; vice-president, George Krouse, Jersey City; treasurer, John Campbell, Maher & Flockhart; secretary, Ulrich Eberhardt, Gould & Eberhardt. The following executive committee was re-elected: Gerald Hannay, James Flockhart, George Krouse, Paul Debevois, Louis Sacks.

The adjoining properties and plants of the Lehigh Foundry Co. and Lehigh Car, Wheel & Axle Works, Fullerton, Pa., have been merged into one organization to be known as the Fuller-Lehigh Co. Offices of the new company will be maintained at Fullerton. The two companies have for a number of years been under the same management and the change is one of name only. The executive personnel remains the same. These companies specialize in chemical castings, special castings in green sand or loam, lining plates for tube mills and ball mills, crusher repair parts, car wheels and axles, sprocket and traction wheels, pulverized coal equipment, including dryers, crushers, and furnace feeders, etc.

The Nipigon Reserve Iron Co. has opened an office at Fort William, Ont., with J. W. Newcombe in charge. The company, which is capitalized at $375,000, will develop 200 acres of iron land in the Nipigon District.

General Electric Labor Troubles

On May 1 over 100 cranemen employed at the General Electric Co., Pittsfield, Mass., quit work. It is reported that they walked out in sympathy with the crane men, who had struck the day before at the Schenectady, N. Y., plant of the company. It is reported that the crane men at the latter plant demanded an increase in wages of 25 per cent, but that no demand was made by the Pittsfield strikers before they walked out. Some of the striking crane men were later sent to the plant by their leaders to help load Government material and it was stated that this policy would continue while the men were out.

At a meeting held May 3, the Metal Trades Council, which comprises the unionized workmen in the Pittsfield plant, voted to quit Monday morning at 9 o'clock and to notify the Department of Labor at Washington of its vote. The employees demand:

A new working agreement which will settle questions now in dispute and bring about harmony; the right of the unions to elect their conference committees as they deem fit; the elimination of all forms of the individual contract and that no such contracts be offered to any of the employees or to any person seeking employment.

The labor leaders are quoted as having stated that they have the backing of the labor unions at the Schenectady plant and that the workers of the two plants have agreed that no settlement will be made singly. The labor leaders claim that about 70 per cent of the 7200 employees belong to the unions.

Liberty Car & Equipment Co. Buys Plant

The Liberty Car & Equipment Co., which was recently organized by P. H. Joyce, 20 West Jackson Boulevard, Chicago, has a contract for 1000 freight cars for the railway administration and 400 for use in France. The company purchased, for manufacturing purposes, the plant of the Central Locomotive & Car Works, Chicago Heights, Ill. Mr. Joyce is president of the Illinois Car & Mfg. Co., Hammond, Ind.; the Indiana Car & Equipment Co., and the Steel Car Co., Cleveland. Mr. Joyce states that the latter three companies are not involved in the formation of the new company. The Illinois Car & Mfg. Co. has been in existence 10 years.

American Iron and Steel Institute Directors

At the annual business meeting of the American Iron and Steel Institute, held May 6, the following directors were reelected for the three-year term ending 1921: James A. Burden, James A. Campbell, Thomas Cantley, Eugene G. Grace, William A. Rogers, J. F. Welborn.

Colonel Maben retired from the board on account of ill health and Thomas K. Glenn, president of the Atlantic Steel Co., Atlanta, Ga., was elected to succeed him.

New Canadian Electric Steel Foundry

The Hull Iron & Steel Foundries, Ltd., Hull, Que., is building an addition to its plant which will include a cleaning department with all necessary equipment, new annealing ovens, and oxy-acetylene welding apparatus. The building will be 100 x 300 ft., with private sidings. The company has just put into operation a 6-ton electric furnace with a 1200kva. transformer.

The Indiana Coke & Gas Co. has decided to build an addition of 30 Koppers by-product coke ovens at its plant at Terre Haute, Ind. It was recently announced that the company would build 15 new ovens, but later the order was doubled.

The Ozark Valley Railroad, which was put up for sale recently under order from the United States District Court at St. Louis, has been sold to the Bender Iron & Supply Co. of Shreveport, La., for $188,500 to be scrapped.

OBITUARY

CLAYTON C. INGERSOLL

LIEUT. CLAYTON CASKEY INGERSOLL, Rockford, Ill., was killed in an airplane accident in France April 24. The news came in a telegram received last week from the War Department by Winthrop Ingersoll, president Ingersoll Milling Machine Co., Rockford, Ill., the father of the young man. It is presumed that Lieutenant Ingersoll was killed while engaged in practice maneuvers. He was born in Rockford 22 years ago and had been a student at Cornell University. After being in several American camps, he embarked for France about Feb. 25.

EDWIN O. WOOD, Flint, Mich., and closely associated with the General Motors Co., died last week in Pasadena, Cal. In 1910 he was vice-president of the General Motors Co., but resigned. He returned to the organization in 1915 and has been in close relation with W. C. Durant, president. In 1916 he was elected a director. He was prominent in politics, being chairman of the state Democratic central committee, and at one time a candidate for governor.

PHILIP M. SCHEELER, treasurer of the Buffalo Wire Works Co., and secretary-treasurer of the Buffalo Galvanizing and Tinning Works, Buffalo, died April 23, after one day's illness of pneumonia. Mr. Scheeler, while only 33 years of age, had comparatively large business experience in the wire cloth field, having entered the firm of the Buffalo Wire Works Co. shortly after his graduation from public school at the age of 14.

ARTHUR L. CLARK, president and treasurer Winsted Edge Tool Works, Winsted, Conn., died May 3, following an operation for intestinal trouble. He was born in Medina, Ohio, 60 years ago, was president of the Hurlburt National Bank, and had served his town in both branches of the State legislature.

May Decrease Production of Agricultural Implements

WASHINGTON, May 7.—For the purpose of conserving materials, labor, capital and manufacturing facilities for war use, the Commercial Economy Board of the Council of National Defense has undertaken a study to determine what varieties of agricultural implements may be dropped by manufacturers without hampering farm work. The industry is co-operating with the board and at an early date formal recommendations will be issued specifying types and sizes that should be eliminated.

The simplification of implement lines will not only save labor in the implement factories and steel mills by making possible longer runs on the machinery; it will also release a portion of the machinery for work on munitions, ships' parts, etc. In addition it will cut down the amount of stock the jobbers and retailers will have to carry, thus releasing capital for the purchase of Government securities.

The study is a part of the board's general work of conserving commercial and industrial resources and facilities. Similar measures have already been taken in the woolen cloth and clothing, the shoe and leather, the paint and other lines, in each case with the co-operation of the industry, and the work of the board will be extended to numerous other industries.

To Test Electric Welding on Ships

A test of electric welding of plates in ship construction is to be conducted by the Emergency Fleet Corporation at the plant of the Federal Shipbuilding Co. at Kearny, N. J. The experiments will be conducted on a section of a full-sized ship. The system of welding and the one which will be followed in assembling the portion of the hull to be experimented with is to make a rapid assembly of the plates of a hull by spot welding them in place and then to complete seams by arc welding, thus also to secure strength and to render the work water tight. By spot welding a ship structure is to be quickly obtained and protection secured for completing the remainder of the ship without regard to the weather or the time of day or night. The spot welds are to be made at distances of about 10 in. apart. For this a yoke has been designed and this and appliances in that connection are to be made by the Universal Electric Welding Co., Long Island City, N. Y. The arc welding is to be undertaken by the Wilson Welder & Metals Co., Inc., New York.

The argument for electric welding appears not so much to lie in the saving of riveting costs as in the elimination of templet punching and fitting work, the last often a troublesome matter owing to inaccuracies of punching. It is estimated that there is likelihood of a saving of a month's time in construction and of no less than $40 per ton in the steel in the structure, or of perhaps $100,000 on a 10,000-ton vessel.

For the experiments one-quarter of the section of the ship to be tested will be riveted and the other three-fourths welded. The test portion of the hull will be built on land out of the way of shipways, so as not to interfere with the general shipbuilding, and of materials not otherwise needed for regular ship construction. It will be tested by filling with water and shifting points of support. The tests comprehend subjecting the structure also to more or less abuse, such as by bumping with rams.

Chicago Molders on Strike

Despite the fact that foundry managers in Chicago offered their molders $5.25 per day of 8-hr., a higher rate than is paid in any nearby locality, about 5000 of the men are on strike, and unless a settlement or some intervention soon follows war work is certain to suffer. Most of the union shops are affected and some of the open shops, a member of the local foundrymen's association declaring that it is a "fifty-fifty" situation, although a representative of the National Founders' Association says that few open shops are on strike. Those most concerned are the union jobbing shops which some time ago sought to please their men by granting an 8-hr. day.

The original demand of the men, made some time prior to May 1, was for $6 per day of 8 hr. They had been receiving $4.50 per day. The employers offered as a compromise $5.25 per day of 8 hr., but the men refused to accept this and countered with a proposition that they should receive $5.50 per 8-hr. day for the next six months, and $6 per day thereafter. At present the situation is a deadlock, with the employers determined to stand firmly on their offer, and questioning the patriotism of men who at a time like the present will refuse to work for $5.25 per day of 8 hr. So far as can be learned, the Government has taken no steps.

Tractor Train Service

The Liberty Equipment Co., Columbus, Ohio, has been incorporated at $100,000, for the purpose of running tractor train service between Detroit and Toledo, immediately. The company will start with eight high power tractors and 16 trailers, having a total capacity of 75,000 tons. Practically the entire capacity has been secured by large Detroit and Toledo concerns. The Liberty Highway Co., capitalized at $50,000, will later start tractor trains between Toledo and other cities. Frank C. Schmidt and Frank L. Baird are among the incorporators of the two companies.

Machinery Markets and News of the Works

SHELL CONTRACTS IN WEST

Chicago District Expects New Munition Orders

Detroit Automobile Manufacturers Look for Further Curtailment of Production

Inquiry for machine tools in the Chicago market discloses that many companies are expecting contracts for shells, hand grenades, depth bombs and other munitions. The Dodge Mfg. Co., Mishawaka, Ind., and the L. Wolff Mfg. Co., Chicago, have received shell contracts. Further munition contracts are expected also by automobile manufacturers in the Detroit district, as there will undoubtedly be another curtailment in production of passenger automobiles.

The Winslow Brothers Co., Chicago, has placed fairly large orders for shell-making tools. The Mosler Safe Co., Hamilton, Ohio, has bought tools in Cincinnati for gun-carriage work.

Cincinnati machine-tool builders report that delays in shipments of tools have been largely due to difficulties in getting castings from the foundries and inability also to get tool steel promptly from the mills, but these troubles are being remedied, and the situation is much better than a few weeks ago.

There is a shortage of skilled labor in several manufacturing districts, notably Detroit and New England. In Detroit, manufacturers on war work are now short about 20,000 men and a total of 47,000 will be required soon for expansion of war work. In New England shops, many machines are standing idle for lack of operators.

The Marlin-Rockwell Corporation, New Haven, Conn., has issued a list of 116 tools for the toolroom at the Mayo plant.

There is no very large buying in the New York market. The Wright-Martin Aircraft Corporation, New Brunswick, N. J., placed nearly all of its orders last week, but it had difficulty in getting the required deliveries on some lots of tools.

The New York Shipbuilding Corporation, Camden, N. J., will add to its fabricating equipment. Many new shipbuilding companies are getting started on plants and will require equipment soon.

New York

NEW YORK, May 7.

Except for the orders placed early last week by the Wright-Martin Aircraft Corporation, New Brunswick, N. J., the past week has been comparatively dull in the machine-tool market. De Camp & Sloan, Inc., Newark, N. J., have placed a few small orders for Government work and the Submarine Base at New London, Conn., is buying for repair shops, but aside from these the buying has been mostly of single tools.

The New York Shipbuilding Corporation, Camden, N. J., which recently bought 10 cranes for shipways, will also add to its fabricating equipment, having asked for quotations on punches, shears, etc. The construction of merchant ships and submarine destroyers at this plant will be speeded up. A number of new shipbuilding projects are talked of in the trade but as yet none of these has come into the market for equipment. The Submarine Boat Corporation, Port Newark Terminal, N. J., has bought 22 electric hoists from the Franklin Moore Co.

Crane business is not especially active, and there is a tendency on the part of some builders to shade prices considerably. A 20-ton crane was sold recently at slightly less than $8,000, which is about half what it would have cost a year ago.

The Government is building a warehouse at Baltimore for dissembling motor trucks for shipment abroad and will purchase about 10 small cranes and hoists. The American Locomotive Co. has bought a 10-ton Shaw crane for its Schenectady plant. The Lundin Steel Casting Co., Neponsit, Mass., has placed an order for a 5-ton crane.

Machine-tool builders and other owners of machine shops complain of a scarcity of operators. In some shops machines are standing idle for lack of operators.

Owing to prohibitive land valuation, the proposed new shipbuilding plant of the Carolina Shipbuilding Corporation, 415 Broadway, New York, will be located at Wilmington, N. C., instead of Charleston, S. C., as previously announced. A site has been purchased on the Cape Fear River, Wilmington. The plant will comprise an initial construction of six shipways; a one-story fabricating shop, 160 x 350 ft.; and a one-story mold shop, 80 x 150 ft. The entire works will consist of 14 buildings. The company has a contract from the Emergency Fleet Corporation for 12 all-steel freighters. Lorenzo Dilks is president. Construction work will be in charge of Paul Starrett of the George A. Fuller Co., 175 Fifth Avenue, New York, officials of this company being interested in the shipbuilding organization.

The George Haiss Mfg. Co., 365 Rider Avenue, New York, manufacturer of coal-handling machinery, has filed plans for a one-story brick addition, 50 x 66 ft., to cost $15,000.

The Klauder-Weldon Dyeing Machine Co., Market Street, Amsterdam, N. Y., manufacturer of dyeing machinery, has increased its capital from $120,000 to $200,000. Headquarters of the company are at Yardley, Pa.

The E. W. Bliss Co., Adams and Plymouth streets, Brooklyn, has awarded contracts to the Hedden Construction Co., 52 Vanderbilt Avenue, New York, and W. H. & F. W. Cane, Woolworth Building, for the erection of a seven-story addition to its projectile works on Fifty-third Street, near First Avenue, 200 x 300 ft., to be supplemented by a pier 60 x 575 ft.

The Todd Shipyards Corporation, 15 Whitehall Street, New York, has awarded a contract to the Barth S. Cronin Co., 573 Clinton Street, Brooklyn, for an addition to its shipbuilding plant at the foot of Henry Street, Brooklyn, to cost about $100,000.

The Litho Machinery Co., New York, has been incorporated with a capital of $10,000 by J. G. Kremer, H. and I. Weinstein, 830 West 170th Street.

The Dexter & Adams Machine Co., New York, has been incorporated with a capital of $50,000, by G. Rosendale, R. H. Garretson and S. C. Whitbeck, 52 Broadway, to manufacture machinery.

R. M. Owen & Co., 1767 Broadway, New York, operating an automobile service plant at 1 West 142d Street, have increased their capital from $100,000 to $1,000,000.

The United Electric Light & Power Co., 130 East Fifteenth Street, New York, has purchased property at 115-119 West Ninety-seventh Street, 47 x 100 ft., and plans the erection of an electric power station on the site.

Post & McCord, contractors, 101 Park Avenue, New York, have commenced the erection of a one-story repair shop, 100 x 175 ft., for the Morse Dry Dock & Repair Co., foot of Fifty-sixth Street, Brooklyn.

Fire, May 3, destroyed part of the plant of the Meurer Steel Barrel Co., Third and Oliver streets, Long Island City, N. Y., with loss estimated at $100,000. Jacob Meurer is president.

The Expert Machine & Tool Corporation, New York, has been incorporated, with a capital of $25,000, by R. Borsuk, 1888 Belmont Avenue, and B. Minenberg, 2109 Daly Avenue.

The Enameling & Stamping Corporation of New York, Brooklyn, has been incorporated, with a capital of $200,000, by H. F. Holbrook, W. I. and M. F. Fickling, 600 West 116th Street, to manufacture enameled ware, etc.

The Interborough Rapid Transit Co., 165 Broadway, New York, will build a new electric power station, 62 x 100 ft., at 150-4 West Sixteenth Street, to cost $40,000.

The Racich Asbestos Mfg. Co., 609 West Fifty-fifth Street, New York, has purchased property, 90 x 115 ft., at Hancock Street and Harris Avenue, Long Island City, and plans a four-story plant.

The Standard Shipbuilding Corporation, 44 Whitehall Street, New York, has acquired, under lease, the shipbuilding works of the Birch Point Shipyard, Wiscasset, Me., and will start the construction of six vessels.

The Foundation Co., 233 Broadway, New York, is planning to increase the capacity of its shipyard at Brunswick, Ga., formerly operated by the Carpenter-Watkins Co. The present works of six shipways will be enlarged to provide for building barges and vessels over 100 ft. long. The plant will be operated under the name of the Foundation Co., Carpenter & Watkins, Inc. The Foundation Co. has recently incorporated in Delaware the Foundation Co.-Howard Shipbuilders, with capital of $1,500,000, to operate a shipbuilding plant. Franklin Remington is present.

The Hudson Wire Co., Snowden Avenue, Ossining, N. Y., manufacturer of wire products, will build a two-story addition, 25 x 35 ft.

A. Kadisj & Co., New York, have filed articles of incorporation, with a capital of $10,000, to operate a brass works. D. H. Spielman, A. Kadisj and H. A. Bernstein, 1326 Southern Boulevard, are the incorporators.

A new five-story power plant, to cost over $350,000, will be erected by Kenneth Stevenson, 25 Broad Street, New York, at 172-80 Water Street. Construction of the building, 105 x 115 ft., has been commenced.

The Autographic Time Lock Corporation, New York, has been incorporated, with a capital of $250,000, by J. J. and C. V. Doyle, 142 East Eighty-third Street, and M. A. Lewis, 135 Broadway, to manufacture time-recording instruments, locks, etc.

The Improved Appliance Co., 455 Kent Avenue, Brooklyn, manufacturer of gas appliances for industrial use, has filed plans for a four-story addition to cost $10,000.

The Central Smelting & Refining Co., Rider Avenue, Long Island City, has awarded contract to the MacGobar Construction Co., 1178 Broadway, New York, for a 1½-story addition to its smelting works, 75 x 175 ft., to cost $25,000.

The Svendsen Shipbuilding Co., Brooklyn, has been incorporated, with a capital of $100,000, by S. S. Farrell, A. A. Roman, and P. Svendsen, 351 Sixty-fourth Street, Brooklyn.

The World Chemical & Metal Co., New York, has been incorporated, with a capital of $100,000, to manufacture iron, steel and other products. R. Herscopf and S. R. Hopkins, Jr., 40 Church Street, and C. Kennedy, 2 Rector Street, are the incorporators.

Buffalo

BUFFALO, May 6.

The Ferguson Steel & Iron Co., 1399 Bailey Avenue, Buffalo, has acquired about 7 acres on the Buffalo River, near the foot of Hamburgh Street, and plans the immediate erection of a shipbuilding works for the construction of steel vessels for the Government. The plant will give employment to about 700 hands for initial operations. E. P. Butts is manager.

The Buffalo Wash Tray Co., Buffalo, has purchased property on Tonawanda Street for its proposed plant. The company plans for the immediate erection of the new factory.

The plant of W. G. Palmer, Inc., North Tonawanda, N. Y., manufacturing ammunition boxes for the Government, was destroyed by fire on May 2, with a reported loss of $40,000.

The Triangle Tool Co., Erie, Pa., has been incorporated with a capital of $30,000 by John L. Alexander and associates, to manufacture tools.

The George E. Page Metal Products Co., Rochester, N. Y., has been incorporated with a capital of $100,000 by A. J. Stickney, W. Poppe and George E. Page, to manufacture metal household utensils and kindred products.

The American Locomotive Co., Schenectady, N. Y., is having plans prepared for a one-story addition to its Dunkirk plant, 80 x 125 ft.

The Johnson Knitting Machine Co., St. Johnsville, N. Y., manufacturer of knitting machinery, has increased its capital from $18,000 to $50,000.

The Athens Shipbuilding Corporation, Athens, N. Y., has been incorporated with a capital of $100,000 by H. R. Every, Athens, and E. S. Anthony, Coxsackie.

The Aborn Steel Co., Inc., New York, has opened an office in 520 Marine Bank Building, Buffalo. The Buffalo section is in charge of D. J. Mahoney as district manager for the Aborn Steel Co., Inc., and the Century Steel Works.

New England

BOSTON, May 6.

Business conditions in the machine tool and other metal-working plants remain virtually unchanged. While occasional delays are reported in the factories because of the non-delivery of needed raw materials, this has not become a pronounced factor. Production is well maintained and in some cases is increasing. The large number of men going into the war forces is causing some disruption of working schedules, but this has not been reflected yet in lowered production.

One fairly large list of machine tools has made its appearance, having been issued by the Marlin-Rockwell Corporation, New Haven, Conn., for the toolroom at its Mayo plant. The list called for 116 machines, including 14, 16 and 18-in. lathes, milling machines, bench lathes and bench milling machines and other toolroom equipment. It is reported that a considerable part of this list has already been closed. The munitions plants and shipyards continue to be steady purchasers of equipment but are not issuing lists, picking up machines here and there as needed.

This section has been free from large labor troubles for some times; but as this is written there is talk of a strike involving about 5000 employees at the Pittsfield, Mass., plant of the General Electric Co., which was expected to take place early this week. The 1800 strikers, who were out for 19 days at the Eagle Lock Co., Terryville, Conn., have returned to work without securing concessions. Elsewhere the attitude of labor seems to be that every employee should devote all of his energy to the turning out of the needed war products.

The Coastwise Ship Engineering Corporation, Boston, has been incorporated with authorized capital stock of $225,000. James L. MacEachran is president and William W. Rich, 85 Devonshire Street, treasurer.

The Davis & Furber Machine Co., North Andover, Mass., has awarded contracts for an assembling building, 80 x 160 ft., two stories, and for extensive alterations to a one-story forge shop, 75 x 150 ft.

The Dunbar Brothers Co., Bristol, Conn., is to build three additions, 45 x 120 ft., four stories; 35 x 60 ft., four stories; 32 x 45 ft., one story.

The Liberty Devices Co., Boston, has been incorporated with authorized capital stock of $50,000 to manufacture carburetors and automobile accessories. Luther C. Brown is president and George M. Brown, New York, treasurer.

The Emergency Fleet Corporation is expected to build at Bath, Me., 100 houses for employees of the Bath Iron Works and 200 houses for employees of the Texas Steamship Co.

The Bangor-Brewer Shipbuilding Co., Bangor, Me., has been incorporated with authorized capital stock of $100,000. Charles D. Stanford is president and George H. Hamlin treasurer.

The Miller Metal Works Co., Jersey City, N. J., has purchased a plant in Southington, Conn.

The Wright Wire Co., Worcester, will erect a power house, 100 x 128 ft., one story, at its Palmer, Mass., plant.

The Marlin-Rockwell Corporation, New Haven, has begun work on an addition, 40 x 48 ft., one story. It has also awarded a contract for a shooting-range building, 60 x 98 ft., with ell 50 x 117 ft., one story.

The M. & G. Aircraft Co., Westfield, Mass., has been incorporated with authorized capital stock of $50,000, William H. Ensign is president, Frank E. Cowles treasurer.

The Remington Arms-Union Metallic Cartridge Co., Bridgeport, Conn., will erect an addition, 112 x 256 ft.; also a two-story building, 50 x 223 ft.; two one-story buildings, 60 x 120 ft. and other one-story structures.

The Clark Bolt & Nut Co., Milldale, Conn., has awarded a contract for an addition, 46 x 51 ft., to its boiler house.

The Colt's Patent Fire Arms Mfg. Co., Hartford, Conn., has awarded a contract for an addition, 41 x 76 ft., one story.

The Bangor Shipbuilding Co., Bangor, Me., is having plans drawn for a shipbuilding plant to be located at Hampden, Me.

The Narragansett Machine Co., Pawtucket, R. I., has awarded a contract for the rebuilding of that part of its plant recently destroyed by fire.

Landers, Frary & Clark, New Britain, Conn., are having plans drawn for an addition, 33 x 65 ft., 48 x 60 ft. and 13 x 70 ft., one story.

The F. W. Cheney Co., Manchester, Conn., recently incorporated with a capital stock of $33,000 by Charles and Horace B. Cheney and others, is not a manufacturer of machines and tools, as has been stated, but is a realty corporation, organized to take care of the Homestead property at that place.

The announcement in THE IRON AGE of April 18 covering the incorporation of a New England Castings Co., East Longmeadow, Mass., was incorrect. The correct name of the company is the New England Steel Castings Co. H. G. Meadows is president and general manager.

Philadelphia

PHILADELPHIA, May 6.

The Apollo Steel Co., Lincoln Building, Philadelphia, operating a plant on Warren Avenue, Apollo, for the manufacture of steel sheets, etc., has awarded a contract to the Hughes-Foulkrod Co., Commonwealth Building, Philadelphia, for a one-story brick and steel addition to cost about $45,000.

The Keystone Supply & Mfg. Co., 927 North Ninth Street, Philadelphia, manufacturer of steam specialties, plumbers' supplies, etc., will build a two-story addition.

The Quaker City Motor Parts Co., Philadelphia, has been incorporated with a capital of $100,000 by Arthur Letchworth and others to manufacture automobile parts.

The Bureau of Yards and Docks, Navy Department, Washington, is preparing plans for a new power plant at the League Island Navy Yard, Philadelphia.

Effective May 16 the 10-story plant of the Ford Motor Co., Broad Street and Lehigh Avenue, Philadelphia, will be commandeered by the Government. It is said the machinery will be removed and the entire floorspace of over 10 acres given over to Government operations.

The Pittsburgh Truck Wheel Corporation, Philadelphia, has been incorporated in Delaware with a capital of $50,000 by F. R. Hansell, Land Title Building, Philadelphia, and others.

The General Textile Machinery Co., 4925 Royal Avenue, Philadelphia, has acquired the former plant of the Wharton Switch Works, Jenkintown, and will equip and occupy it for its own use. The property consists of about 12 buildings and over 20 acres of land. The purchase was made by W. S. Duell, president of the company, which now operates a plant at Langhorne.

The American Forge & Steel Corporation, Philadelphia, has been incorporated with a capital of $10,000 by George Isabel and others to manufacture iron and steel specialties.

The Electric Storage Battery Co., Nineteenth Street and Allegheny Avenue, Philadelphia, is taking estimates for an addition to its works.

The Aetna Foundry Co., Inc., Twenty-second Street and Allegheny Avenue, Philadelphia, has awarded contract to A. Raymond Raff, Seventeenth and Thompson streets, for a one-story addition, 50 x 70 ft., and 20 x 50 ft.

The Storage Battery & Appliance Co., Philadelphia, has been incorporated in Delaware with a capital of $150,000 by Donald G. Scott, William Knoblock and William J. Graham.

Announcement is made of the completion of the plant of the Westinghouse Electric & Mfg. Co., at Essington, Pa. Sections of the works have been in operation for some time past, and from now on the entire plant will be operated at capacity for the manufacture of Westinghouse-Melville-McAlpine steam turbine reduction gears and other marine power equipment. The plant site includes an area of 110 acres, with seven large buildings, of about 35 acres floor area, including a foundry, with capacity for close to 4,000,000 lb. per month, forging plant, machine shops, erecting works, pattern shop, and power plant. The company, it is said, has orders on hand to cover more than 18 months continuous operation.

The American Gas Generator Co., Camden, N. J., has been incorporated with a capital of $200,000 by William S. C. Roray, Francis J. Smith and Lewis Clark.

The Pusey & Jones Co., Wilmington, Del., has announced that, following the merger of the Pennsylvania Shipbuilding Co., the New Jersey Shipbuilding Co., Gloucester City, N. J., and its Wilmington works, the name of the new company, covering all interests, will be the Pusey & Jones Co. Headquarters will be located at Gloucester City, including the naval architect and marine engineering offices. Each yard will continue with a separate organization for shipworks and office management.

The New York Shipbuilding Corporation, Camden, N. J., has filed plans for a new shop, 40 x 95 ft., at Broadway and Fairview Street.

The Hanover Wire Cloth Co., Hanover, Pa., manufacturer of wire goods, is having plans prepared for a one-story addition, 100 x 150 ft.

The Perkasie Forge & Machine Co., Perkasie, Pa., is planning to rebuild its plant, partially destroyed by fire April 29, with a reported loss of $10,000.

The Lancaster Iron Co., Lancaster, Pa., is building a two-story addition, 40 x 80 ft.

The Carpenter Steel Co., Reading, Pa., is taking bids for the erection of a one-story addition, 135 x 146 ft., to be known as building 37.

The Bond Foundry & Machine Co., Manheim, Pa., manufacturer of pulleys, hangers, etc., is planning a two-story pattern shop, 25 x 150 ft., to cost $10,000.

The Lansdale Foundry Co., Lansdale, Pa., is taking bids on the construction of an addition to its foundry, 70 x 120 ft. H. I. Landis is president.

The Marietta Casting Co., manufacturer of hollowware, Marietta, Pa., whose plant was damaged by fire recently, has resumed full operation. George F. Stibgen is secretary and manager

Baltimore

BALTIMORE, May 6.

The Phillip-Kell Co., Hille and Forest streets, Baltimore, sheet-metal worker, has increased its capital stock from $10,000 to $25,000.

The Rockwell Loading Co., Delaware City, Del., has commenced the construction of a shell-loading works on 500 acres of land recently acquired. It is said that the plant will employ at first about 4000 workers.

The Cumberland Valley Spoke & Bending Co., Hagerstown, Md., is planning to rebuild its plant recently destroyed by fire with a reported loss of $40,000.

The Virginia Shipbuilding Corporation, Alexandria, Va., has awarded contracts to the Raymond Concrete Pile Co., 90 West Street, New York, and to Frederick T. Ley & Co., 19 West Forty-fourth Street, New York, for the construction of a shipbuilding plant on the Potomac River, to cost about $5,000,000. The initial works will consist of 12 one and two-story buildings, including a machine shop and a foundry.

The power plant of the Fort Pitt coal mines, Dillies Bottom, Ohio, near Moundsville, W. Va., was destroyed by fire April 28, with loss estimated at $25,000.

The proposed shipbuilding plant of the Liberty Shipbuilding Co., Brunswick, Ga., to be located near Wilmington, N. C., will consist of six shipways, with shop and erecting buildings. A waterfront site of 40 acres has been secured. Max Schoolman is general manager.

The Chatham Motor Co., Savannah, Ga., is considering the erection of an addition to cost about $45,000.

The Jacksonville Machinery & Boiler Works, Jacksonville, Fla., has been incorporated with a capital of $10,000, by J. J. Field, B. M. Cole and F. C. Sawyer.

The Dixie Brass & Foundry Co., Birmingham, Ala., has been incorporated with a capital of $15,000, by L. and G. R. Cohn and Charles Wegelin.

Chicago

CHICAGO, May 6.

With orders for small groups of machines coming from many quarters, business is decidedly of a satisfactory character so far as demand goes. The slight betterment in deliveries that recently existed is fast fading away. A scarcity of medium-sized engine lathes, which have been rather easy to procure, is now developing, and some warehouse floors are more bare of lathes than they have been in a long time. The Winslow Brothers Co. took a lot in the past week. Planing, milling and shaping machines are no easier to buy than they have been in recent months. Big lathes, of course, continue difficult to locate for any kind of near delivery. Screw machines are fairly easy, but large turrets cannot be shipped so promptly. Small drills exist in ample sufficiency.

The very large list issued by the Chicago, Burlington & Quincy Railroad a few weeks ago is now out of the mechanical department of the road and action may come along soon. Serving the railroads is practically equivalent to serving the Government.

The inquiry for tools discloses that many firms in this section have contracts, or hope to get contracts, for the manu-

facture of hand grenades, aerial shells, depth bombs and other war munitions. Some of those having such contracts are figuring on increasing their capacity.

The Dodge Mfg. Co., Mishawaka, Ind., has received a large contract for shells and probably will require new equipment. The L. Wolff Mfg. Co., Chicago, has also received a shell contract. The H. G. Saal Co., Chicago, has bought a number of new tools. The Stromberg Motor Devices Co., Chicago, has received a contract for carburetors for Liberty motors.

The strike of molders is causing some uneasiness in the machine tool trade, but as yet it has felt no serious effects. Much attention is being given to the farm tractor industry, inasmuch as that industry appears to be going through a stage similar to the one which existed in the early days of the automobile. It is recognized that many of the concerns now projected will fall by the wayside, but as the industry steadies much will come of it. Two or three tractor companies are now inquiring for tools. The industry is being helped along by some of the states, Michigan, for instance, having appropriated money for the purchase of 1000 tractors and tractor plows to be placed with farms at cost and on advantageous terms in order to thoroughly test their usefulness to the average farmer. The great movement will come when it is demonstrated that a farmer can safely dispose of most of his horses and depend almost entirely upon a machine for traction purposes.

The Austin Co., contractor, 1430 Euclid Avenue, Cleveland, has been awarded a contract by the Kropp Forge Co., 2512 West Twenty-first Street, Chicago, for a one-story factory, 150 x 350 ft. on site of eight acres at Twelfth Street and Fifty-fourth Avenue, Cicero, a suburb of Chicago. The building is the forerunner of a large plant, is to cost about $85,000, and to be completed this summer.

Frank D. Chase, Inc., industrial engineer, Peoples Gas Building, Chicago, has been awarded a contract by the Green Foundry & Furnace Works, Des Moines, Iowa, for remodeling a recently purchased four-story steel and concrete building, to which will be added a foundry, 106 x 110 ft. The cost of the work will be about $75,000.

Bids are being taken by J. C. Llewellyn, architect, 38 South Dearborn Street, Chicago, for a four-story top addition to the three-story plant of B. Heller & Co., manufacturing chemists, Calumet Avenue, between Thirty-ninth and Fortieth streets, Chicago.

The Lanquist & Illsley Co., 1100 North Clark Street, Chicago, has been awarded the contract on a percentage basis for a two-story factory, 80 x 100 ft., which is to be added to the Crane Co.'s large plant at West Forty-first Street and Kedzie Avenue, Chicago.

An enlargement to the molding room of the Decatur Malleable Iron Works, Decatur, Ill., is being planned.

Plans have been completed for rebuilding the plant of the Berry Iron & Steel Co., St. Joseph, Mo., recently destroyed by fire. Two buildings which were burned will be replaced with five, designed for railroad foundry work, and it is hoped to have them completed in 45 days. The main foundry room will be 50 x 260 ft. and contain two cranes.

Reports from Clinton, Ill., are to the effect that the Illinois Central Railroad is going ahead with shop improvements at that place. The machine shop is to be rebuilt, the erecting shop enlarged, a new power house erected, new boilers installed and much other work done, for all of which contracts have been let. Some of the work is under way.

A new electric power plant to cost about $60,000 will be erected by the Illinois Central Railroad, Chicago, at Ninety-eighth Street and Cottage Grove Avenue. Joseph E. Nelson & Sons, 118 LaSalle Street, are the contractors.

Milwaukee

MILWAUKEE, May 6.

Orders for milling machines and machine tools are keeping manufacturers so well occupied that it has not been possible to make the least headway on deliveries; in fact, schedules even show lengthening. The orders are small, averaging only two or three machines, but these form a large volume. Business is coming from almost every part of the country and from a wide variety of sources, although all demands are closely identified with Government requirements.

The labor situation is becoming more acute by reason of the extraordinary demands of the draft. The substitution of woman labor is fraught with numerous difficulties, female help being limited by law to 8 hr. per day, day-time labor and employment only between 8 a. m. and 5 p. m. An extensive inquiry of women as metal workers is now being made by the Industrial Commission of Wisconsin. The report of the Milwaukee free employment bureau for April shows that only 25 per cent of orders for labor could be filled with the supply of men available.

The Independent Harvester Co., Milwaukee, has been incorporated under the laws of Delaware with an authorized capital stock of $3,500,000 by Milwaukee interests to take over the business of the Independent Harvester Co., Plano, Ill., which has been in the hands of a receiver since Dec. 11, 1917. The capital stock of the new company is divided into $2,500,000 of common and $1,000,000 of preferred stock. The new interests include Albert J. Earling, former president and now chairman of the board of the Chicago, Milwaukee & St. Paul Railway; his son-in-law, Lawrence Fitch, an officer and director of numerous large metal-working corporations of the Middle West; Grant Fitch, banker; Francis Bloodgood, Jr., and Jackson B. Kemper, of Kemper, Bloodgood & Kemper, attorneys, Milwaukee. The present plant at Plano, Ill., will be kept in full operation, adequate capital having been provided to execute the volume of unfilled orders as well as new business being offered.

The Standard Crucible Steel Casting Co., 719 Thirtieth Street, Milwaukee, sustained an estimated loss of $35,000 by fire which on April 30 badly damaged its foundry and auxiliary buildings. The company broke ground about 10 days ago for a one-story brick and concrete addition, 42 x 123 ft., work on which will be rushed to provide facilities pending the reconstruction of the original plant. George F. Birkel is secretary.

Bliss Brothers, 208 Manufacturers Home Building, Milwaukee, manufacturing tools, dies, etc., have incorporated under the style of the Bliss Brothers Tool Co., with a capital stock of $15,000. The incorporators are William A. Bliss, Arthur M. Porter and Redmond P. Bliss. The company is seeking larger quarters to make its output more commensurate with orders. It has made considerable increases in capacity the past six months but needs more space.

The Marwin Motor Truck Co., Chicago, incorporated recently under the laws of Delaware with $1,000,000, has purchased the former plant of the Skidd Mfg. Co., Kenosha, Wis., and is installing additional machine-tool and other equipment for the manufacture of motor trucks and farm tractors. A. F. Williams, Chicago, is vice-president.

The J. I. Case Threshing Machine Co., Racine, Wis., has awarded the general contract for designing and erecting a one-story brick and steel addition, 144 x 513 ft., to its South works machine shop, to Klug & Smith, consulting and contracting engineers, Mack Block, Milwaukee. The addition is made necessary by the large domestic and export demands for farm tractors and other agricultural machinery. The improvement, together with equipment, will cost in the neighborhood of $100,000.

The Wisconsin Gear & Axle Co., Milwaukee, expects to occupy its new plant at State Street and Hawley Road, town of Wauwatosa, on June 15, and will engage in the manufacture of safety castor axles for motor cars, trucks and similar purposes. The first unit consists of a one-story machine shop, 50 x 120 ft., of brick, steel and concrete. The company maintains temporary offices at 29 Plankinton Arcade, Milwaukee. Jacob Schamer is president, C. E. Frederickson vice-president and general manager, and H. G. Bruhuke, treasurer.

The Madison Machine Tool Co., Madison, Wis., has been incorporated with a capital stock of $25,000 to manufacture machinery, tools, shop equipment, etc. The incorporators are E. J. McEachron, Thomas C. Olson and E. A. Fuller. Definite details of the company's plans will be issued later.

The Filer & Stowell Co., 219-245 Becher Street, Milwaukee, manufacturer of sawmill machinery, engines, etc., is taking bids until the end of this week for the erection of a new forge shop, 60 x 150 ft., of brick and steel contruction, designed by Martin Tullgren & Sons, architects.

The Production Pattern & Equipment Co., Milwaukee, organized recently with a capital stock of $25,000, has leased the building at 94-96 Second Street, and is installing equipment for the manufacture of metal and wood patterns, templets, etc. Paul E. Keller is manager.

The Cream City Casket Co., 490 Thirty-second Street, Milwaukee, will build a two-story factory addition, 40 x 120 ft., and a new office building, the improvements to cost about $20,000. The architects are Leiser & Holst, Germania Building.

The Milwaukee Die Casting Co., 297 Fourth Street, Milwaukee, has awarded contracts for the erection of a $15,000 addition to its plant. The architect is Alfred C. Clas, Colby-Abbot Building.

The Pawling & Harnischfeger Co., Milwaukee, has awarded contracts for the erection of a one-story brick and steel machine-shop addition, 80 x 175 ft., to its main works at Thirty-eighth and National avenues.

The Marshfield, Wis., board of public works is taking bids until May 11 for furnishing and installing a 500-gal. vertical centrifugal pump in the municipal waterworks. E. B. Waite is superintendent.

Julius Eis, Two Rivers, Wis., manufacturer of hay bale ties, fence stays and other wire products, has disposed of his business and factory at Twelfth and Monroe streets to Peter H. Scherer, who will largely increase the production.

Whitney Brothers, shipbuilders, Superior, Wis., who were awarded contracts for constructing four ocean-going tugs for the Government, have completed a two-story punch shop, 50 x 225 ft., and will build a pipe shop 40 x 100 ft. The second story of the punch shop is devoted to a molding loft. Steel for the tugs is now arriving and the working force is being increased to 250. The company also has a number of private contracts for small, heavy-duty craft to be undertaken as soon as the Government order is filled.

Detroit

DETROIT, May 6.

Purchases by munition works continue to sustain the machine-tool market at a level higher than normal. Few large orders are placed, inquiries being generally for one or two machines, often for replacement. Deliveries are better, although the less expensive tools are much easier to obtain. Predicted labor trouble May 1 did not materialize. The skilled labor shortage is daily growing more acute. A census taken last week shows it to be now about 20,000, and reports from plants indicate an increase to 47,000 within six months, due to the opening of large munition plants. Howard Hay, representing the Navy Department, met local manufacturers Monday afternoon to outline plans to prevent the further drafting of skilled men into Government service.

The coal situation is handicapping manufacturers. Under the zone distribution system, Detroit is practically deprived of Pocahontas or New River "smokeless" coal, upon which its industries have largely depended. Little of the best quality West Virginia and Kentucky lump is being received. The situation is serious, due both to the lack of the desired quality and the refusal of dealers to buy any kind of coal because of the marginal profit of $2.50 per ton fixed by the State Fuel Administrator. Dealers state they lose money on the small margin and are not stocking up. As a result both industries and homes are facing another coal famine. The State Fuel Administrator will meet with heads of large industries and the mayor Monday afternoon in an attempt to solve the difficulties.

Detroit automobile manufacturers are expecting a further curtailment of automobile manufacturing, and are preparing for it by requesting Government munition contracts. It is believed that additional shell orders will be placed in this district. The Chalkis Mfg. Co., Detroit, is expecting an additional order for 75-mm. guns.

The Power Truck & Tractor Co., Detroit, has been organized with a capital stock of $2,500,000, and a well-equipped factory has been purchased with facilities for turning out several thousand trucks and tractors a year. The company will build 1-ton, 2-ton, 3½-ton and 5-ton models, and will also manufacture two tractor models. An order for 1000 tractors has been received from a Canadian automobile and implement concern. The company plans to build 3000 trucks and 3000 tractors this year. The officials of the company have not been announced.

The Peninsular Shipbuilding Corporation, Muskegon, Mich., has purchased ground on the west shore of Muskegon Lake for a shipbuilding plant. It will start with a capital stock of $500,000 and will float $500,000 in bonds. It is planned to have the plant completed within four months and to begin work with a force of not less than 500 men.

Properties of the Reid Towing & Wrecking Co., Port Huron, Mich., have been taken over by the Foundation Co., 233 Broadway, New York, through its representative, A. R. Morrison, who announced that the Foundation Co. has contracts for ships for the French, Italian, United States and other governments, and that the boats to be constructed at the Port Huron yard will be 250 ft. in length. He states that the Reid properties have been placed at the disposal of the Government for war purposes so long as needed, and after the war will be continued as a commercial plant. The Reid brothers retain a large interest in the property. The first boats to be turned out will be for the French Government. Ten keels will be laid.

The Motor Products Corporation, Detroit, has let contracts for an addition to be built to its factory on Mack Avenue.

The plant of the American Machine Corporation, Port Huron, Mich., purchased from the American Machinery Co. several weeks ago, was destroyed by fire last week as the result of an explosion. The loss is estimated at $200,000. The present company has a contract for ammunition shells for the Government, and was to have put on three 8-hr. shifts last Monday.

The Four-Wheel Drive Motor Truck Co., Webberville, Mich., is turning out its first motor trucks. The company incorporated Oct. 2, 1917, and began work on the factory building Oct. 17. It is incorporated for $50,000, with the following officers: President, A. H. Catlin, Webberville; vice-president, Frank D. Wellfare, Lansing; secretary and manager, F. A. Young; treasurer, Dr. William W. Thorburn, Lansing.

The Economy Drawing Table Co., Adrian, Mich., will erect a new factory building which will double its present quarters and increase its rate of production three-fold.

The Boyne Traction Motor Co., Boyne City, Mich., has been organized with a capital stock of $75,000. Tractors will be made as soon as equipment is secured. The incorporators are Frank Kedan, John Bergy, W. L. Martin, William Rapelin and W. S. Shaw.

The Universal Gear Works, Detroit, has been incorporated with a capital stock of $30,000 by Bert Banta and Frank J. Brown.

The Accurate Tool Co., Detroit, has been organized with $15,000 capital stock. Henry C. Linbach, George H. Craig and Charles McBain are stockholders.

The Horizontal Hydraulic Hoist Co., Detroit, has filed articles of incorporation with a capital stock of $100,000. Edward R. Bacon and Sherman D. Callender are the principal stockholders.

The Continental Motors Corporation, Muskegon, Mich., has purchased 34 acres adjoining its plant.

Nelson Brothers & Co., Saginaw, Mich., manufacturers of gasoline pumps, pump jacks and grinders, have taken over the plant and business of the Saginaw Motor Car Co. The two companies have been merged under the name of the Nelson Brothers Truck Co. with an authorized capital stock of $300,000. The company will continue to manufacture the Nelson Brothers & Co. products and will produce trucks on a large scale.

The Wolverine Tractor Co., Saginaw, Mich., will soon begin work on its new plant, and it is expected that the factory will be completed by July. The first building will be 100 x 250 ft. W. E. Wood, Detroit, is president.

The Cooley Castings Co., Bay City, Mich., is rapidly rebuilding its brass foundry, and has under way a new stock and pattern storage building, as well as other units to replace its plant which was destroyed by fire April 6 with an estimated loss of $25,000. W. F. Cooley is president.

The Daigle Iron Works, Detroit, has had plans prepared for a one-story addition, 45 x 190 ft., to its plant on Lafayette Boulevard.

The Kelsey Wheel Co., Detroit, will erect a one-story addition to its plant on McGraw Avenue, 80 x 125 ft., estimated to cost $20,000.

Cleveland

CLEVELAND, May 6.

Three Ohio manufacturers engaged in Government work have placed orders for about $65,000 worth of machinery, and an inquiry for 68 standard machine tools has come out from another company. With these exceptions the demand is mostly for single tools, with the call very active and coming largely from makers of motor trucks, gun carriages, gun sights and airplane parts. While round lot buying has to a large extent fallen off, business as a whole is very good and fully equal to normal times. An improved demand is noted for screw machines from Eastern brass manufacturers. No new Government orders of a size sufficient to require the purchase of a great deal of additional equipment are reported. There is little new factory extension work coming out, although a number of additions planned to take care of Government orders have not yet been completed. The demand for foundry equipment is light. Steel and malleable foundries are crowded with work, and delieveries are slow, but gray-iron foundries could take a little additional business.

The Stearns Aero Parts Co., Cleveland, has been incorporated with a capital stock of $50,000 to manufacture airplane parts. F. B. Stearns, former president of the F. B. Stearns Co., automobile builder, heads the company. It is stated that the only machinery requirements at present will be a few tools for experimental work.

The France Mfg. Co., 1434 West Seventy-fifth Street, Cleveland, will erect a new plant of Berea Road. It manu-

factures magnetic rectifiers, ammeters, electric meters, carbon rheostats and rotary wire strippers.

The Lakewood Engineering Co., Cleveland, has secured permission to increase its capital stock from $300,000 to $1,100,000, none of which will be issued at present. The increase has been made partly because of the recent purchase of the plants of the Dynamic Motor Truck Co., Galion, Ohio, the Duplex Foundry & Mfg. Co., Elyria, Ohio, the Milwaukee Concrete Mixer Co., Milwaukee, and the Marsh-Capron Mfg. Co., Chicago.

The Austin Co., Cleveland, has taken a contract for two factory buildings for the Auto Power & Malleable Mfg. Co., Omaha, Neb., 80 x 240 ft. and 40 x 80 ft. respectively.

The Medina Machine Co., Medina, Ohio, has increased its capital stock from $25,000 to $75,000 and has taken in new interests, including T. E. Henry and E. S. Moncrief, of the Henry Miller Foundry Co., Cleveland, and L. N. Allen, Detroit. Mr. Allen has been made vice-president and C. J. Miller, secretary-treasurer. W. D. Griesenger continues as president and R. D. Fildes as manager. The company will enlarge its plant by the erection of a concrete building, 70 x 120 ft.

The F-R-X Mfg. Co., Norwalk, Ohio, will establish a plant for the manufacture of fire extinguishers. It has a capital stock of $150,000. Eugene Englert is president and Aro D. Sanders secretary.

The Timken Roller Bearing Co., Canton, Ohio, is planning the erection of additional buildings to add to the capacity of its roller-bearing department.

The Bay View Foundry Co., Sandusky, Ohio, will add the manufacture of steel castings to its present line of gray iron castings. A new cupola, convertor and other equipment will be installed.

The Defiance Screw Machine Products Co., Defiance, Ohio, will enlarge its plant by a three-story extension, 50 x 75 ft., to one of its buildings.

Cincinnati

CINCINNATI, May 6.

Inquiry for machine tools shows considerable improvement, but orders have not yet developed, principally due to the inability of builders to make the deliveries wanted. The Mosler Safe Co., Hamilton, Ohio, has purchased within the past few months a large number of machine tools to be used mostly in building gun carriages and will need a few more later on.

Machine tool builders who have lately been having a great deal of trouble getting castings report the situation is easing up somewhat, and deliveries are being made more promptly. Some trouble was previously experienced also in getting shipments of high-speed steel from the mills, but this has now been remedied and very few complaints are registered.

The Cincinnati building commissioner was notified last week by an officer of the United States Corps of Engineers to submit to him applications for permits to erect industrial plants or additions to existing ones. The order originated from the War Department, and all construction projects within the congested industrial region of the East and Middle West must be reported to the chairman of the War Industrial Board before a permit is granted to proceed. This action will not affect any buildings now under way and will probably not cause delays in the construction of any proposed additions to plants, as these contemplated improvements are for factories engaged either directly or indirectly in war work.

The Cincinnati Bickford Tool Co. is installing equipment in its new addition at Oakley that will increase the present capacity of its machine shop fully 50 per cent. It is expected to be ready for operation by June 1. A. H. Tuechter is president.

The R. K. Le Blond Machine Tool Co., Cincinnati, has removed its offices from its plant on Eastern Avenue to its new factory in Hyde Park. Reports that the Government has taken over the Eastern Avenue plant for the manufacture of small arms are officially reported as premature. The company, however, has been notified to retain possession of the property pending instructions. Only about one-half of the machinery has been removed to the new building.

Littleford Brothers, Cincinnati, boiler and tank makers, have let contract for a two-story brick and steel assembling addition, 70 x 100 ft., to its plant on East Pearl Street.

The Worthington Pump & Machinery Corporation, Cincinnati, has awarded contract for a six-story addition to its plant, 60 x 186 ft., of reinforced concrete. It will be used as a pattern shop and for storage purposes.

Bohn & Correl, Union Trust Building, Cincinnati, is a new partnership formed to handle machinery and machinists' supplies. Catalogs are desired from manufacturers.

The Dimler-Himes Tool Co., Dayton, Ohio, will be incorporated with $12,000 capital stock by William J. Dimler and H. F. Himes. The company was formerly known as the Crescent Machine & Tool Co., whose plant at Third and Canal streets has been acquired and will be remodeled.

The Advance Foundry Co., Dayton, is preparing to enlarge its plant. A. H. Kramer is president.

It is reported that Henry Ford & Son, Detroit, will build a plant at Columbus, Ohio, for the manufacture of farm tractors. No official confirmation has been obtained.

Marvin Rossiter, Troy, Ohio, has purchased the machine shop of the Julian Mfg. Co., and will add some equipment.

The United States Motor Truck Co., Covington, Ky., has started foundations for an addition to its plant, 75 x 190 ft., three stories, of brick and steel. The company is building a large number of motor trucks for Government service in this country and in France.

The Central South

LOUISVILLE, May 6.

The Louisville & Nashville Railroad will rebuilt its wheel and axle shop at South Louisville, recently destroyed by fire with an estimated loss of $75,000.

Major Gilbert, construction quartermaster, Camp Zachary Taylor, Louisville, has received authorization from Washington for the construction of a large refrigerating plant and seven warehouses.

Meal and grain drying machinery are two new lines being manufactured by the Louisville Drying Machine Co., Louisville, which formerly made brewers' and distillers' drying equipment.

The Guyan Machine Shops, Logan, W. Va., is in the market for 15 or 20 hp. alternating current motors, three phase, 60 cycle, 220 volt, 1200 r.p.m., and is asking prices on bolt-heading and threading machines.

The Thornhill Wagon Co., Lynchburg, Va., is asking prices on a 100 hp. horizontal boiler.

The Santee Mfg. Co., Eutawville, S. C., is in the market for a 40 to 75-hp. fire box boiler, complete, and a 40 to 50 hp. engine with center crank.

Blowers and general planing mill machinery will be installed by Daniel & Staton, Williamston, N. C.

The Covington Foundry Co., Covington, Ky., has increased its capital from $10,000 to $50,000.

Indianapolis

INDIANAPOLIS, May 6.

The Gary Motor Truck Co., Gary, Ind., has increased its capital stock from $100,000 to $1,000,000.

The American Appliance Co., Indianapolis, has increased its capital stock from $150,000 to $250,000.

The Nordyke & Marmon Co., Indianapolis, has taken out a permit for an addition, 120 x 176 ft., to the airplane section of its plant.

The Lupton Parcel Post Scale Co., Evansville, Ind., has been incorporated with $5,000 capital stock. The directors are Ralph A. Lupton, Frank A. Straley and James M. Bloxsome.

The Hammond Pattern & Model Works, Hammond, Ind., has been incorporated with $25,000 capital stock. The directors are William Howarth, Edward A. Kirk and J. George Geyer.

The Indiana Steel Products Co., Valparaiso, Ind., is building an addition to its plant that will double its capacity. The company has Government work. W. J. Morris is manager.

The plant of the American Bridge Co., Gary, Ind., has started the manufacture of guns of the heavier type, and when in full operation will turn out about 40 per month. The first shipment of guns will be made about May 15.

The Empire Brass Foundry, Richmond, Ind., has been incorporated with $10,000 capital stock to manufacture metal products. The directors are Albert V. Hurrell, James E. Jones and Joseph H. Hill.

The Hercules Gas Engine Co., Evansville, Ind., has increased its capital stock from $250,000 to $450,000.

The Guide & Signal Light Co., Shelbyville, Ind., has been organized and will establish a plant to manufacture an

oscillating device for fans and searchlights, the invention of L. Greenberg, Indianapolis. C. S. Camplin, Detroit, will be manager.

The Liberty Pressed Metal Co., Kokomo, Ind., is having plans prepared for new works, to include machine shop, metal-working shop and other structures.

The Hugo Co., Warsaw, Ind., manufacturer of vacuum cleaners, etc., will build a one-story addition, 40 x 150 ft.

St. Louis

ST. LOUIS, May 6.

The Medart Mfg. Co., St. Louis, has acquired a site adjoining its plant on which it will erect an addition.

The Dressel Collapsible Rim Mfg. Co., St. Louis, has been incorporated with a capital stock of $250,000 by Edward C. Ferguson, Joseph F. Keshner and W. E. Dressel and others to manufacture automobile tire devices.

The Plaquemine Brick Yard Co., Plaquemine, La., Adonis P. Schnebelin, president, is in the market for about $15,000 worth of heavy brick-making machinery.

The Sugar Creek Gin, Grain & Supply Co., Gracemont, Okla., John Pape and others interested, is in the market for about $20,000 worth of machinery for a ginnery.

Gueydan, La., is in the market for about $15,000 worth of electric lighting equipment, $10,000 worth of ice-making machinery and $20,000 worth of waterworks plant machinery.

The Chickasha Refining Co., Chickasha, Okla., capital $300,000, has been incorporated by E. F. Jones, Clark W. Trammell and others and will equip an oil refining plant.

The Blue Ribbon Oil Refining Co., Walters, Okla., John Aldridge, Oklahoma City, Okla., president, will equip a refinery with a daily capacity of 5000 bbl.

The De Queen Lumber Co., De Queen, Ark., J. A. Stallcup, Hot Springs, Ark., president, W. O. Creason, De Queen manager, will install motor-driven machinery for a mill with a daily capacity of 100,000 ft.

The Merchants Feature Films Studio, Inc., St. Louis, has been incorporated with a capital stock of $250,000 by S. E. Alexander, George E. Bailey and others to manufacture motion picture apparatus.

The Klartoid Mfg. Co., Syndicate Trust Building, St. Louis, M. H. Schroeder president, has acquired a factory and will install special machinery for the manufacture of boxes and non-inflammable containers.

The C. J. Snyder Co., Little Rock, Ark., has been incorporated to equip a machine and repair shop and is in the market for about $25,000 worth of machinery.

The Federal Steam Specialties Co., Oklahoma City, Okla., has been organized by F. X. Loeffler, W. E. Price and others, and will equip a plant requiring about $25,000 worth of machinery.

W. M. Wood, president of the Decatur Bridge Co., Decatur, Ill., and others will equip a six-way steel shipyard at New Orleans for the construction of fabricated steel ships.

The Foundation Company, New York, will equip a plant for the construction of steel ships at New Orleans, with oil-burning equipment.

The Safety Aeroplane Mfg. Co., Dewey, Okla., has arranged for the use of temporary buildings pending the erection of a new plant for the manufacture of airplanes. The company was recently incorporated with a capital of $150,000. A. J. Poncelet is president and general manager.

Texas

AUSTIN, May 4.

Preliminary surveys have been made for an irrigation system and hydroelectric plant to be constructed on the Frio River near Knippa, to irrigate approximately 100,000 acres. Charles A. Lindsay, Wichita, Kan., and associates are promoting the project.

The Gulf Refining Co., Port Arthur, has increased its capital stock from $7,500,000 to $15,000,000. It is stated that the company will enlarge its facilities by the construction of one or more new refineries.

The Southern Motor Mfg. Association, Ltd., Dallas, will soon begin the erection of a plant for the manufacture of motor trucks.

The Alliance Milling Co., Denton, will install new machinery in its flour mill to increase the daily capacity from 400 to 500 bbl. The improvements will cost about $50,000.

The Southern Oil Refining Co., Fort Worth, has purchased a site for an oil refinery. The first unit will cost about $75,000.

The Emergency Fleet Corporation will establish an assembling plant at Beaumont to equip the 52 wooden ships now being built in the fifth district. The plant will cost about $500,000. The Government will furnish the 1400-hp. triple-expansion engines, wireless apparatus and other equipment to be installed in each vessel. William M. Hind, Beaumont, is superintendent of installation.

According to the Texas Board of Water Engineers, the following permits have been granted for the installation of irrigation pumping plants: M. H. Dunshie, Hamshire, 782 acres; John and A. J. Wilfert, Hamshire, and R. Lee Bass, Eunice, La., 1000 acres; Mrs. M. Willis Jackson, Victoria, 445 acres; W. Brandenberg, W. T. Owen, L. J. Ivy and T. M. Berry, El Paso, J. B. Dale, Dallas, and J. E. Dale, Henrietta, 2000 acres; W. J. Neale, Waco, 300 acres, and Guy Deaton, Hamshire, 1050 acres.

The Beaver Valley Oil & Refining Co., Cisco, which is developing a large acreage of oil-producing leases is assembling material for the construction of a refinery. The company plans to lay a system of pipe lines to connect its own and other wells with the proposed refinery. L. W. Tarkington, Waurika, Okla., is president.

San Francisco

SAN FRANCISCO, April 30.

The demand for marine engines has turned the attention of the larger machine shops and many of the shipbuilding plants to this matter. It is said that the awakening was brought about by Charles Schwab, recently appointed head of the Government shipbuilding activities. Machine shops in considerable number are calling for bids for machinery suitable for assisting in making these engines, and this has brought about an increased liveliness in all classes of machinery. Practically all deliveries on larger machines are made only on Government order, but the delivery on smaller tools, of which there is said to be a large stock on the Eastern market, is very much easier, although there has been no accumulation on this coast as yet. The scarcity of some lines of machinery is shown by the fact that a large plumbing house of this city has just sold for $700 a pipe-threading machine for which it paid $225 12 years ago.

It is officially estimated that fully 30,000 persons are engaged either directly or indirectly in shipbuilding in this district, with a weekly payroll of $1,000,000. This will be materially increased with the completion of the plans of the Union Construction Co., and may be doubled if all the other projected shipyards materialize.

The Union Construction Co., Oakland, is expanding for the purpose of building ships. The contracts for dredging and piling have already been let and the work is in progress. Plans for the plate shop, 90 x 360 ft., have been completed and those of the machine shop, 100 x 300 ft., are almost finished. The company has bought the Boston Machine Shop, Oroville, and will move its machinery to Oakland. The larger machine tools needed in the new enterprise have not yet been secured.

The California Steel Products Co., San Francisco, has been incorporated with a capital of $100,000 by W. E. Kettering, E. P. McCann, L. D. Gordon, T. K. Code, R. J. McGashie, all of San Francisco. It will engage in the steel and iron, general foundry, machine-shop and shipbuilding business.

The plans of the Bethlehem Steel Co. for the erection of a large steel ship repair plant at Hunter's Point, San Francisco, have been accepted by the Government. The plans call for the erection of one of the largest plants of the sort in the country. Three floating docks with a lifting capacity of 8000, 4000 and 3800 tons respectively are to be moved to the new location and two additional floating docks will be built. Machine shops, fabricating plants, a marine railroad and other equipment are included, the total to cost approximately $2,000,000.

The Government has awarded the general contract for the erection at a cost of $23,000 of a temporary frame machine shop and a machinists' mates school on the eastern half of Rockwell Flying Field. The machine shop will be 140 x 150 ft. Commander Leonard M. Cox, U. S. N., public works officer for the Twelfth District, will have supervision of the work.

The Associated Oil Co., San Francisco, has let a contract for the erection of a repair and machine shop at Illinois and Eldorado streets, at a cost of $36,000.

The Union Industrial Works, San Francisco, has been incorporated with a capital stock of $2,000,000, by Walter W. Johnson, Oakland, and Thomas R. White, C. J. Goodsell, C. F. Shaw and M. L. Reinecke of San Francisco. It will engage in the general shipbuilding business.

The Air Compressor & Equipment Co., San Francisco, has been incorporated for $25,000 by James J. Callahan, Fred Siebenhauer, and K. Baxter, to manufacture machinery for compressing air.

The West Coast Machinery Co., San Francisco, has been incorporated with a capital of $10,000 by John Riley, E. M. Leonard and S. A. Riley, to manufacture scientific, agricultural, commercial and other machinery.

C. W. Hansen, San Francisco, has taken a contract for $20,000 to build a concrete, steel and galvanized iron factory for the Fleuschman Co., on Minnesota, near Twenty-fifth street.

Frederick G. Hamilton, president Monopohela Tool & Machine Co., is reported to be looking for a favorable location for a branch factory on San Francisco Bay.

The Duplex Machine Tool Co., San Francisco, has been incorporated for $50,000 by F. G. Blymer, C. W. Schmacker, both of Berkeley, and F. G. Burgh of San Francisco, to do a machinist and engineering business.

The Pacific Northwest

SEATTLE, April 30.

The successful adapting of plants to take care of auxiliary ship machinery has increased and many improvements and extensions to machine shops and foundries are under construction in an effort to keep up with the demand for equipment.

The lumber business continues in satisfactory volume, with increasing demand for export. Indications point to enlarged Government buying, for cantonments as well as material for barges for use on inland waterways.

The machine shop of the Sumpter Valley Railroad, Baker, Ore., was recently destroyed by fire with a loss of $40,000.

The Hendricks Mfg. Co., 3301 First Avenue South, Seattle, will erect a machine shop.

Preliminary work has been started by the Norway Pacific Dry Dock & Construction Co., Everett, Wash., on its proposed shipyards.

The Thorsen-Hendricksen Light & Power Co., Toledo, Ore., has changed its name to the Lincoln County Light & Power Co. The plant will be enlarged by a 2000 hp. turbine and dynamo and other equipment.

The Skinner & Eddy Shipbuilding Corporation, Seattle, has completed and delivered to the Government eight steel ships, with a total deadweight tonnage of 71,600 tons, since Jan. 1. The plant has 60,000 employees and has completed 10 vessels since November.

The Pacific Construction Co., Coquitlam, B. C., plans the installation of four additional shipways, making six in all. It will construct 15 ships under the present program.

Allan & McKelvie, Vancouver, B. C., recently completed the installation of a galvanizing plant at 806 Beach Avenue, equipped with traveling cranes. It holds contracts for all deck pumps for ships under construction by the Imperial Munitions Board.

The Liberty Foundry, Inc., Portland, Ore., has been incorporated for $50,000 by William Cornfoot, shipbuilder, and associates, and has leased the plant of the Lister Sash Weight Co., which it will equip for a foundry and machine shop. It will engage only in war production activities. About 40 skilled foundrymen will be employed. The company plans to add electric welding and brass and bronze casting departments.

The plant of the Panama Lumber & Shingle Co., Olympia, Wash., was recently destroyed by fire with a loss of $40,000. It will probably be rebuilt. Edgar Bordeaux is manager.

The Lumber Products, Ltd., New Westminster, B. C., has purchased a site in Sapperton, B. C., on which it will erect a sawmill with a daily capacity of 60,000 to 70,000 ft.

Canada

TORONTO, May 4.

The Imperial Munitions Board continues to spend between $25,000,000 and $30,000,000 a month on munitions, etc. Canadian manufacturers are looking forward to large orders for 12-in. shells from the United States Government. If contracts are placed it will mean that a number of companies which have hitherto turned out smaller shells will have to install considerable machinery for the 12-in. type. Orders for 9-in., 4.7-in. and 6-in. shells are assured and manufacturers are looking forward to renewed activity for machine tools. Inquiry has been good for general equipment and dealers report very good business prospects. Activity in small tools and general supplies is brisk, particularly for munitions and marine plants. Delivery on many lines is very backward and it is not thought that much relief will be given to the machine-tool trade by the opening of water highways.

The power plant of the Great Lakes Power Co., Sault Ste. Marie, Ont., was damaged by fire May 2 with a loss of $150,000. The plant will be rebuilt without delay.

The Davies Construction Co., 850 Hastings Street West, Vancouver, B. C., has the general contract for the erection of a coach shop for the Canadian Pacific Railway to cost $11,500.

The New Westminster Construction & Engineering Co., will build an assembling plant at the foot of Tenth Street, New Westminster, B. C., to cost about $50,000.

The Lyall Shipbuilding Co., Fell Street, North Vancouver, B. C., will build an addition to its plant to cost $7,000. William Lyall is president.

The McKinnon Sash & Hardware Co., Ontario Street, St. Catharines, Ont., is building a two-story addition at a cost of $45,000, and is in the market for machinery, belting, pulleys, shafting, etc.

The Victoria Toy Mfg. Co., Victoriaville, Que., will build an addition to its plant to cost $25,000.

The machine and forge shop at Hantsport, N. S., owned by Welsh, Foley & Stewart, was destroyed by fire with a loss of $40,000. It will be rebuilt.

The lumber mill owned by the Multhrop Lumber Co., John Island, Ont., was destroyed by fire with a loss of $60,000.

The Fred Thompson Co., Ltd., 9 St. Genevieve Street, Montreal, manufacturer of electrical supplies, has recently completed the erection of a three-story brick plant to take care of its increased business.

The Volta Mfg. Co., Ltd., Welland, Ont., will build a brick addition, 50 x 50 ft., to be used as a machine shop. It manufactures electric hoists, electric furnace controllers, etc.

S. M. Roberts, Montreal, has been appointed president and general manager of the Grain Growers' Auto Tractor Co. The company is looking for a site in Ontario where it purposes to establish a plant for the manufacture of tractors, farm implements, etc.

The Toronto Shipbuilding Co., Toronto, is in the market for 6-in. and smaller pipe cutting and threading machines, also a hack saw.

The Canadian Standard Products, Ltd., St. Catharines, Ont., has been incorporated with a capital stock of $100,000 by Francis T. Garner, Edward H. Neelon, George F. Peterson and others, to manufacture metal drawings, stampings, forgings, boilers, tools, etc.,

The Canadian Graton & Knight, Ltd., Montreal, has been incorporated with a capital stock of $100,000 by Rupert H. Jackson, Francois P. Brais, Jules Bruneau and others to manufacture leather and rubber goods, belting, etc.

The Harlbut Co., Ltd., Preston, Ont., has been incorporated with a capital stock of $150,000 by Clayton E. Harlbut, George P. Harlbut and others, to manufacture rubber and leather goods, etc.

The Canadian Toys, Ltd., Hamilton, Ont., has been incorporated with a capital stock of $100,000 by Cecil V. Langs, Ewart G. Binkley and others, to manufacture toys

The Beaver Stamping Co., Ltd., Walkerville, Ont., has been incorporated with a capital stock of $40,000 by Robert T. Herdegen, Pearson Wells, Bernhard F. Kiesel and others, all of Detroit, Mich., to manufacture metal castings, stampings, etc.

The plant of the Canada Beds, Ltd., Chesley, Ont., was destroyed by fire April 26, with a loss of $40,000. The machine shop and equipment were a total loss.

Peacock Brothers, Montreal, contemplate the erection of a plant for the manufacture of Weir feed water pumps for marine service. The company is adding to its other activities a fully equipped repair department for recording instruments and other appliances requiring acute adjustment, which will be in charge of E. Dawson.

The British Forgings, Ltd., Toronto, has been granted a permit for the erection of an addition to its forge shop, in the Ashbridges Industrial Area, to cost $80,000.

Charles P. Archibald & Co., have opened an office at 164 St. James Street, Montreal, to handle railroad, marine and pulp mill supplies, together with all kinds of general machinery. Mr. Archibald, who is in charge of sales will continue to represent the Ottawa Car Co.

The Dodd Heating Systems, Ltd., Toronto, has been incorporated with a capital stock of $100,000 by John O'Neil, Henry S. Dodd, 313 Eglington Avenue; John Sheedy and others, to manufacture machinery parts and accessories for heating and engineering specialties.

The Blashill Wire Machinery Co., Ltd., Montreal, has increased its capital stock from $48,000 to $100,000.